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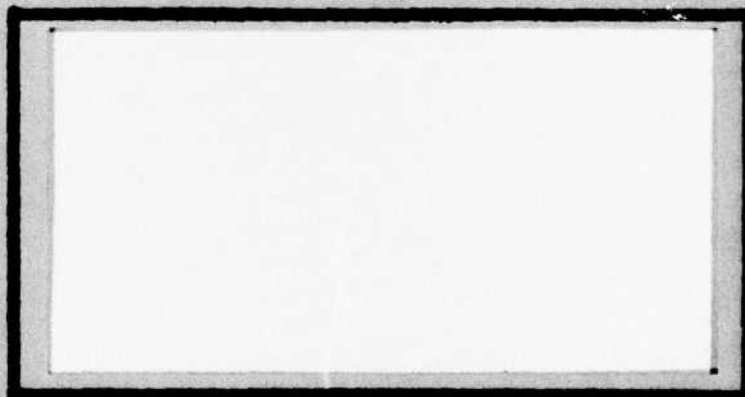
UNITED STATES AIR FORCE
AIR UNIVERSITY
AIR FORCE INSTITUTE OF TECHNOLOGY
Wright-Patterson Air Force Base, Ohio

CONFLICT IN CIVILIAN AND AIR FORCE
PROGRAM/PROJECT ORGANIZATIONS: A
COMPARATIVE STUDY

Karl J. Eschmann, Captain, USAF
Terry S.H. Lee, Captain, USAF

LSSR 3-77B

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4 *This thesis*

System Program Office

The research analyzed the conflict environment in Air Force (SPO)
Organizations. The objective was to compare the conflict intensi-
ties faced and the modes of resolution used by Air Force program
managers with those experienced by civilian program managers over
the program life-cycle. These variables were measured in an Air
Force sample of program managers using the same instrument that a
civilian research team had used in a study of civilian program man-
agers. The Air Force program manager measurements indicated that,
as in civilian programs, the perceptions of the conflict intensi-
ties changed over the program life-cycle. However, when compared
directly with the civilian findings, the data did not demonstrate
similarities in what was changing and in which direction. Further,
Air Force respondents perceived lesser overall conflict intensities
than civilian managers. Differences in these changes were attri-
buted to organizational and environmental factors. A comparison
of the modes of resolution used, however, showed that both groups
of managers tended to use similar means to deal with conflict. The
study's findings can provide Air Force program managers with evi-
dence to help identify where the greatest conflict exists within
their own programs, and guide them in selecting means of dealing
with the conflict.

CONFLICT IN CIVILIAN AND AIR FORCE PROGRAM/PROJECT

ORGANIZATIONS: A COMPARATIVE STUDY

A Thesis

Presented to the Faculty of the School of Systems and Logistics

of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the Requirements for the

Degree of Master of Science in Logistics Management

By

Karl J. Eschmann, BS   Terry S. H. Lee, BS
Captain, USAF   Captain, USAF

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This thesis, written by

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and

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COMMITTEE CHAIRMAN

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CHAPTER I

INTRODUCTION

As a concept for managing and acquiring new major weapons systems for the Air Force, program management is a relatively new and dynamic process. Since its adoption by the Department of Defense, procedures surrounding program management have evolved to their present state, and are even now changing as efforts are made to apply, improve, and update the concept (3:97).

This research deals with the behavioral aspect of conflict in Program/Project Management. For the purpose of this thesis, project management will refer to the management of specified projects under the direction of a designated project manager with the authority to cut across traditional organizational boundaries in order to fulfill his project's objectives. The term program management is used to refer to managing the longer-life, complex military program organizations--the Air Force Weapon System Program Offices (SPO)--or very large and technically complex civilian programs which may contain many ongoing projects. A comprehensive research effort comparing the similarities and differences between project and program management concepts was conducted by Lempke and Mann in their 1976 research (37:9-34). Although the concepts are relatively similar, the structural differences may be significant enough

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to warrant a distinction. Also, for the purpose of this thesis, the term SPO manager will be defined as a manager in a weapons system program organization whose role is to tie together, manage, and direct the development and production of a system in order to meet the performance, schedule, and cost objectives assigned to that program (16:3). Throughout this study, the term SPO manager will also refer to the Air Force's counterpart to the civilian program/project manager. Those other managers in a SPO associated with strictly functional type jobs will be excluded from the term, SPO manager. In both Air Force and civilian organizations, the program/project management concepts are found to be operational in that crossing of traditional functional lines is required to accomplish the program/project objectives.

Conflict is a potential problem which faces every manager. As a major characteristic of human behavior in our society, it is inherent in a program/project management environment (47:465). Whenever authority flows in horizontal and diagonal directions, or cuts across other lines of authority on the organizational chart, the potential for conflict increases proportionately (15:78). This relationship is summed up by Kast and Rosenzweig:

> The essence of program management is that
> it is interfunctional and is often in conflict
> with the normal organizational structure. Thus
> where the program management approach is used,
> there is a natural conflict system. Instead of

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an organization operating under the traditional
view with a well defined hierarchical structure,
a unity of command, and clearcut authority and
responsibility relationships, the system is
much more dynamic and less structured [31:233].

However, the nature of this inherent conflict is
not necessarily functional or dysfunctional. As cited by
Walton and Dutton in their model of interdepartmental con-
flict:

To determine whether the conflict has an
adverse effect on organizational performance,
one must assess the consequences of these char-
acteristics. Whether a competitive orienta-
tion is in fact energizing or debilitating for
members of the unit will depend in part on the
personalities of the participants. For some,
competition is motivating and arouses energies
not otherwise available for organizational
tasks; for others conflict is a major threat.
Whether competitive energy will contribute to
over-all performance depends upon whether a
unit can improve its performance without inter-
fering with the performance of another unit
[62:80].

The ability of the program/project manager to foster
functional conflict, or to convert dysfunctional conflict
to functional conflict, can often determine the degree of
success in achieving the project's goals (14:304). It be-
comes one of his important functions to maintain harmony
among many organizational elements with conflicting objec-
tives. To do this, the program manager needs to sustain
his effort to employ continual negotiation to keep the pro-
gram moving smoothly and efficiently. In this manner, he
uses purposeful, or deliberate conflict whereby he and the
functional managers negotiate the what, when, who, and hows

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of the organizational effort (13:78).

Many of the factors relating to conflict can affect the productivity of personnel working in a program management environment. A number of research studies have been conducted concerning the existence of conflict in civilian program/project management organizations (2, 7, 12, 15, 20, 47, 55, 56, 57, 58, 63). However, the literature review has indicated that very few studies have been devoted to studying conflict within a military program management organization.

The military and civilian program/project managers accomplish basically similar jobs but do so in different environments. There are a number of reasons to believe that there may exist a difference in the conflict intensities experienced as a result of environmental differences. Some indications include differences in experience levels for program managers, motives and orientations, leadership styles, layers of management, and outside influences (37:29-33;53:51-57).

Statement of the Problem

Although research studies concerned with conflict have been conducted in civilian program/project organizations, it is not known whether these results are applicable in a military program management environment. There is a need to compare intensities of conflict within military program management organizations with civilian program organizations to determine if the knowledge gained

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by the civilian research can be employed by military program managers to effectively deal with dysfunctional conflict.

Justification of Research Effort

As mentioned previously, a review of the literature revealed a wealth of information relating to the existence of conflict in program/project management. However, only two research teams were found that actually attempted to measure the causes and intensities of conflict (20, 55, 56, 57, 58). No attempts to measure conflict in a military program environment were discovered. The results of such measurements are important because to effectively combat the dysfunctional elements of conflict, a manager needs to know first how to identify these elements (8:10). The basic premise that "to fight your enemy, you must know your enemy," should hold true in minimizing the detrimental effect of conflict.

Program Management in the Air Force is a multi-billion dollar effort. It is also a very complex management technique which includes a host of built-in significant problems (1:60). A considerable amount of effort is being made to improve the acquisition process, including the effort on managing human behavior. This emphasis was expressed by General Bernard A. Shriever:

> Many times we have found the pacing factor
> in acquiring new weapon, support, and command
> and control systems is not technology--it is
> management. All too often technology has been

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known, but it was not properly put to use because of shortcomings in our management ability [60:FWD].

By learning about the causes and intensities of existing conflict, a SPO manager may be better able to cope with problems relating to important program parameters such as cost, schedules, and performance (63:272). The stake involved in controlling these parameters was summed up in a recent article in Aviation Week and Space Technology:

> AFSC's [Air Force Systems Command's] current systems acquisition programs have a value of approximately $7 billion divided between its four product divisions--the Aeronautical Systems Div., Electronic Systems Div., Space and Missile Systems Organization and the Armament Development and Test Center. ASD, the major buyer, has 27 major programs valued at $3.5 billion [22:75].

Thus, during any phase of a program's life-cycle, mistakes, even small ones, can become unacceptably expensive (11:16). The dysfunctional aspects of conflict could possibly contribute greatly to cost growth or low mission effectiveness. Hence, it is important to know the causes and intensities of conflict issues that may vary over the individual life-cycle stages of a program. The life-cycle stages in Air Force programs include the conceptual, validation, full-scale development, production, and deployment phases (24:23). In each of these phases, the SPO manager's awareness of potential conflict, its nature, and occurrence may be beneficial towards enhancing the decision making process (56:1). This awareness can assist the SPO manager in planning for and adjusting for any detrimental effects of conflict if he understands where and when it may occur.

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Related research has indicated some basic assumptions typically assumed to apply to program/project management: (1) that Air Force Program Management and civilian program/project management are generally assumed to be synonymous; and (2) that research conducted in the civilian project organizations typically is assumed to apply to military program organizations. However, if a significant difference does exist, there is a distinct possibility that many of the generally accepted principles associated with program/project management are not compatible or applicable to an Air Force Program Management environment.

Research Objective

The objective of this research is to compare intensities of conflict experienced by SPO managers with those experienced by civilian program/project managers.

The objective will be accomplished in two steps: (1) The intensities of conflict experienced by SPO managers will be measured. (2) The results of the measurement will be compared with the intensities of conflict experienced by civilian program/project managers.

Scope

This study is limited to the comparison of the intensities of conflict and use of conflict resolution techniques by SPO managers of the United States Air Force currently assigned to System Program Offices in the Aeronautical Systems Division (ASD) in the Air Force Systems Command (AFSC).

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Organization of the Study

The remainder of the thesis is composed of four
chapters with content as follows: Chapter 2 is a review
of the literature which describes the current state of
knowledge about the problem being explored. Chapter 3
discusses the research methodology, to include a description
of the population and sample form from which data was
gathered, the data collection techniques, and the analytical
approaches which were used in the research effort.
Chapter 4 presents an analysis of the data and an interpretation
of the results. Chapter 5 presents the conclusions
of the study and recommendations for further research
in related fields.

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CHAPTER 2

A REVIEW OF THE LITERATURE

Numerous studies directly address the historic back-
ground and evolution of program/project management concepts
(2, 4, 5, 6, 14, 17, 27, 34, 40, 41, 51, 52, 63). Other
studies specifically describe the evolution of program man-
agement and its associated problems within DOD, particular-
ly the SPO environment in the Air Force (3, 21, 23, 24, 26,
28, 32, 37, 43, 49, 53, 54). An understanding of the struc-
ture and inherent problems of program/project management is
essential for studying the nature of conflict in a program/
project management environment. Many stress and conflict
theories are addressed in the research studies and books
concerning management, and these readings provide a good
background relating to the existence and nature of conflict
facing program/project managers (7, 12, 15, 20, 42, 47, 55,
56, 57, 58, 63).

In this chapter, potential sources of conflict in
program/project management organizations will be discussed
in detail. Immediately following, several important behav-
ioral characteristics deemed necessary to be an effective
program/project manager will be described. The final topics
to be covered in this chapter are the research findings of
two related studies concerning causes and intensities of

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conflict in a civilian program/project management environment.

Sources of Conflict in Program/Project Management

Before the conflicts that arise in a program/project organization can be considered, the factors which contribute to the level of conflict must be examined. Authors of research studies concerned with identifying conflict in complex organizations have attempted to categorize the primary sources of conflict (8, 10, 18, 19, 29, 30, 38, 39, 46, 59, 61, 62). Walton and Dutton describe some generally inclusive factors from which conflict can arise (62:73):

1) Mutual Task Dependence
2) Task Related Asymmetries
3) Performance Criteria and Rewards
4) Organizational Differentiation
5) Role Dissatisfaction
6) Ambiguities
7) Dependence on Common Resources
8) Communications Obstacles

Each factor is described below in detail, and its relation to a program/project management environment is discussed.

Mutual Task Dependence. This variable describes the extent of dependence that two groups have upon each other in accomplishing their respective tasks. In relating this to program/project management, the mutual task dependence of the program/project manager and functional manager will increase or decrease depending upon the degree of friendliness or antagonism that exists between the two managers. A state of high mutual dependence, coupled with two cooperative groups, leads to collaboration in accomplishing the needed tasks. However,

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the managerial approaches used to accomplish the tasks may then become a source of conflict (45:252). The degrees of cooperation or conflict cannot be predicted as they relate directly to the situation in which the mutual dependence exists. Regardless whether the outcome is favorable or unfavorable, the potential for conflict will increase with increased mutual dependency (62:73-74). This is pointed out in an example by Derr:

> The more two persons or groups are required by the nature of the task to work together (be interdependent), the greater the potential for conflict. If persons must work closely and dependently with one another to get the job done, they will be more sensitive to their disagreements. Forced to collaborate, the magnitude of the consequences of disagreements are intensified to a one-to-one basis because of the nature of the close, enduring relationship. As a result, the potential for friendship or antagonism is in direct ratio to the intensity and frequency of their disagreements. Thus, whenever conflict arises, it is made more intense or less intense by the relative climate of the interdependence between the individuals [18:31].

Task Related Asymmetries. This factor occurs when one group is dependent upon another and the second group has little dependence on the first to accomplish a task. This lack of mutual task dependency can become a cause of organizational conflict. Independent groups who do not have to collaborate on the main body of their work will frequently not communicate or interact with other work groups. These groups will tend to concentrate on their own internal work priorities and generally not understand or seek knowledge of the problems of other persons or groups (18:32). A high degree

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of independence can lead to isolation of the work group

from the organization as a whole. Isolation can become

a danger in decentralized organizations, and frequently

occurs when a functional manager fails to recognize his

interdependence with other parts of the organization (8:

65). As pointed out by Butler, project managers tend to

be totally dependent on other groups:

> The PM [Project Manager] tends to be totally
> dependent on functional departments for fulfill-
> ment of his assignment. Even if he does have
> unambiguous authority, he and the members of his
> team must exercise this authority across organi-
> zational boundaries, and these boundary positions
> are inherently stressful [12:94].

This asymmetry in mutual dependence can mean that

one of the functional departments involved in a project

may have little incentive to cooperate. The project

manager may have to resort to "conflict interference" to

gain his objective. This simply means that he persists

with interfering in the department's task performance

until the needed attention is gained from the independent

unit. Human nature always chooses to lay aside the pro-

blems with the least resistance so that the ones that

cause the most resistance can be dealt with first (62:74).

Performance Criteria and Rewards. Rewards often stem from

reviewing a group's performance criteria and determining

the success of fulfilling the desired objectives (62:75).

Conflict can evolve from rewarding individuals or depart-

ments for the successful accomplishment of a task or pro-

ject, even though many other departments were involved in

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a successful project completion, which may provoke ill
feelings from the other managers who participated. How-
ever, if the project was a failure, then the project man-
ager can rest assured that no hard feelings will result
if he does not include his team members as project con-
tributors (62:75).

The program/project management organization intro-
duces other unique problems associated with rewards. This
concerns rewarding program/project participants who are
temporarily assigned to the team from a functional depart-
ment. Frequently, the program/project manager may not be
in a position to directly reward the support personnel
assigned to his team and therefore has difficulty getting
these individuals to react to his desires. Unless the
assigned team member is placed on the project team on a
long term basis, he normally is evaluated by his functional
department supervisor. Quite often, the assigned member
brings to the project the parochial viewpoint of his own
functional department (58:34). Thus, the program/project
manager must overcome the problem of motivating the assign-
ed personnel to fit his needs (63:274). Wilemon and Cicero
identified this need to do so:

> While the project manager . . . has little
> or no direct influence on promotions and sala-
> ries of his interfacing team members, he does
> have considerable latitude in providing chal-
> lenging and personally rewarding work assign-
> ments for his project team. It should be
> recognized that the project manager, if not
> aware of this internal reward structure, is
> in a position to create increased conflicts

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within his project team [63:275].

Organizational Differentiation. Most complex, modern or-
ganizations require an integration of the numerous uniform
and non-uniform tasks to be accomplished. This can be
done by combining the bureaucratic form of organization
with a more flexible form of organization such as project
management to create a matrix structure (25:268). The con-
tradictory aspects of these two forms will automatically
cause sources of conflict. Differentiation relates to
the degree of specialization and division of labor within
a complex organization (31:214).

> Differentiation is defined as the state of
> segmentation of the organizational system into
> subsystems, each of which tends to develop par-
> ticular attributes in relation to the require-
> ments posed by its revelant external environ-
> ment [33:3-4].

As differentiation increases, the potential for conflict
will also increase due to differences in viewpoints. The
degree of cooperation between the various departments in
an organization determines the need for an overall coor-
dinator such as the program/project manager (62:76). How-
ever, if the organization's functional departments are
working together in a smooth fashion, then the intro-
duction of a project manager may cause conflict because
of over-coordination and/or inexperience with project man-
agement techniques (4:78). In most large technical organi-
zations, a functional manager may not be able to devote
the time necessary to control a complex project (13:145).

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From Butler's observations:

> Managers who adopt project management seem
> to perceive that their functional structures
> cannot effectively integrate multiple projects;
> the basic design is departmentation by special-
> ized function, and much effort is devoted to the
> establishment and clarification of structured
> relationships among differentiated roles [12:88].

Conflicts evolving from differentiation will occur because people and groups approach problems with totally different orientations. Each subsystem tends to serve and protect their own domain, and other groups with different objectives and orientations become "outside interferences" during periods of interdependence (18:28-30). It is a program/project manager's job to integrate these diverse functional areas and channel their efforts towards the successful completion of a program/project (31:231).

Role Dissatisfaction. Problems in this area can be caused by a variety of reasons. One instance concerns the situation where one group with the same or lower status attempts to set the standards for another group. Resistance to accepting this relationship may result in an unresolvable conflict (47:465-6). This situation could deteriorate even more if a forcing approach is used by the imposing group. In relation to program/project management, Butler points out this danger:

> Where the PM is granted complete authority
> . . . the functional department may become a
> passive supporting agency rather than a dynamic
> force which maintains and enhances the special-
> ized capability of the organization. Where the
> PM is supported unqualifiedly by higher manage-
> ment, the functional organization may assume

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the dysfunctional characteristics of the "chron-
ically defeated group" and the overall decision
making process will be hampered . . . [12:94].

It is difficult sometimes to determine the balance
of authority and responsibility required between program/
project and functional managers. The above quote indicates
a problem when a program/project manager has too much
authority, and yet at the other extreme, he may have so
little authority that he is ineffective as an integrative
force. Organizations tend to seek a tradeoff in the ap-
portionment of authority in a project-functional relation-
ship which maximizes purposeful conflict while preserving
the state of the basic structure (12:94).

A program/project manager has basically two types
of authority: formal (legal) authority and informal (influ-
ence) authority. His formal authority is conferred on him
by the organization and it is related to his real or per-
ceived position on the organization chart levels (13:229).
His real power, however, lies in his influence over his
peers and associates, and this in turn is based upon his
professional reputation. This influence relies on a suc-
cessful integration of both his delegated and informal
authority. A program/project manager can therefore pre-
vent or resolve role conflict through proper understanding
and exercise of his authority. The successful program/
project manager learns quickly that his power can be gained
through recognition of his accomplishments by other members
of his environment, and not solely by policy documentation

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and legally delegated authority (13:227-9).

Performance goals from functional departments may also suffer as a result of role dissatisfaction derived from slow organizational growth and a shortage in promotion opportunities. In this situation, the role of the functional manager shift from assisting the program/project manager to realizing the desires of his immediate supervisors. The influential effects of horizontal communication become minimized as the functional manager seeks to please those above him who have the power of promotion. The functional manager may be graded solely on performance criteria related to his department; hence, all other activities, such as project efforts may suffer because of higher functional area priorities (62:76). This problem may be carried over to the program/project by assigned functional support team members. The loyalty of this member may remain steadfast to the permanent functional manager in terms of advancement (47:464).

Ambiguities. Overlapping or confused responsibilities and poorly defined objectives results in conflict. Confusion and ambiguity become common conditions when jobs are not clearly defined, authority relationships are obscure, and lines of communication are loose and unorganized (47:464). Ambiguities can occur anytime it becomes difficult to assess the contributions of individual departments (62:77). Conflict can arise as a result of one group attempting to

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place blame on other groups during failures, or one group
obtaining the credit or rewards for another group's con-
tributions. Obscure authority relationships may lead
to severe problems for individuals assigned to matrix
organizations. Assigned team members may feel that they
really don't know who their boss is and they don't know
for sure whom they should try to please and impress in
order to receive a good evaluation (47:462). In his
investigation into this area, Reeser received numerous
comments such as "Functional people assigned to projects
are forced to have a divided loyalty to their functional
boss and to their project boss. It is so frustrating
to some people that they can't stand it; they often
request to be transferred . . ." [47:462].

Dependence on Common Resources. This factor is summed
up by Walton and Dutton:

> Conflict potential exists when two units de-
> pend upon a common pool of scarce organizational
> resources, such as, physical space, equipment,
> manpower, operating funds, capital funds, central
> staff resources, and centralized services. If
> the two units have interdependent tasks, the com-
> petition for scarce resources will tend to de-
> crease the interunit problem solving and coordin-
> ation [62:77].

Sharing common resources will always provoke ques-
tions of priority. A functional manager may be rated on
the use of his resources, and he may not be willing to
share the risk involved in project uncertainties. Al-
though the program/project manager's success may well

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depend upon the use of functional support personnel, he
may not always have the full authority to commit these
resources to his desired schedule. On the opposite end
of the spectrum, the program/project manager may have
complete authority in selecting the best, most experi-
enced personnel from a functional department. A situa-
tion like this may result in losing the functional manager's
future cooperation and stirring jealousies of power (51:
12-16). Whenever time, schedule, and cost factors relate
to common resources between competing groups, conflict is
likely to ensue. The manner in which the groups resolve
these differences will determine the degree of destruc-
tive conflict that may occur (25:266).

Communications Obstacles. As departments become more
specialized in their respective areas, they tend to devel-
op their own language and view problems in their own per-
spective. The "Jargon" used by individual departments
can contribute to conflict by causing misinterpretations
of situations or problems (62:77). One of the program/
project manager's biggest problems is to interface between
the scientists and the engineers of different functional
groups (63:272). It is to his advantage to have a techni-
cal background related to the project work, as a common
core of experience reduces communication barriers and
decreases the possibility of making unreasonable demands
on functional personnel (62:77).

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The loose and unorganized lines of communication inherent in project management can cause a lack of pertinent information, or even worse, a great deal of misinformation (7:3). Reeser found this complaint to te commonly voiced by people who had been connected with project organizations. The biggest source of frustration focused on the lack of formalized communication lines to deal with the interface relationships between the program/project and functional organizations (47:464). Lack of pertinent information to complete assigned tasks may cause a work stoppage. To alleviate this problem, a program/project manager must exhibit a great deal of thoroughness and personal sense of organization (7:3). Misinformation can result either through a program/project manager's misinterpretation, or through misperception of information on the part of team members or higher management (misinformation flowing either up or down).

Important Behavior Characteristics of a Program/Project Manager

The real key to the successful application of program/project management lies in the choice of the individual assigned to fill the position (4:78). As Davis pointed out:

> . . . project management requires a project manager with considerable role adaptability [17:311].

This is probably the single most important characteristic
to consider when choosing a program/project manager. He
needs to realize that his first foremost considerations
are to be oriented towards broad management techniques
rather than technical details (17:313). In most projects,
the program/project manager may have to make important
decisions on the basis of very little data, which may have
been analyzed in haste. Thus, because of the flexibility
required of such a manager, many men who have been highly
successful in a traditional functional department may not
last long in a project environment (4:78).

A program/project manager should be selected to
head a program/project as a result of his knowledge and
expertise with the field to which the project belongs (4:
79). This does not imply that he should be knowledgeable
in the technical aspects of each area in the organization.
It only means that he should be well informed of the pro-
blems that may be associated with the different depart-
ments, and be aware of the effects of critical decisions
impacting these departments. A program/project manager's
influence may well depend on the respect of the personnel
he works with. Without the respect and cooperation of
the program/project participants, the program/project
manager is doomed to fail. Too often this happens when
the wrong man is chosen. If he does not provide the exam-
ple by leadership needed for team participation, then his

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only influence may be due to the legal authority vested
to him by the organization. In this kind of situation,
the role of the program/project manager has reverted to
that of functional management (25:147). This is exactly
what program/project management is designed to avoid, other-
wise there is no need for it. An example of choosing the
wrong man as a program/project manager is shown by Avot:

> . . . his [project manager's] emphasis must
> be on the overall view and not technical detail.
> In fact, his preoccupation with any single as-
> pect of the project may contribute to a failure.
> For instance, a defense project comprising many
> complex subsystems was highly influenced by
> funding for each of these subsystems. The pro-
> ject manager, though a good engineer, felt
> that his success would be measured by his ef-
> fectiveness in carrying out the administrative
> tasks. As a result, he concentrated on fund-
> ing matters and on shuffling available funds
> between contracts whose scope was constantly
> changing because of inadequacies in design and
> performance. His emphasis on administrative
> matters was soon reflected by the other members
> of the project team. The technical aspects
> and tradeoffs were neglected, and the systems
> cost was much higher than it should have been
> [4:79].

Balanced Orientation is another important behavior
characteristic of an effective program/project manager.
Even though he may be competent in achieving successful
short term results, he must also be capable of seeing "the
big picture". He must integrate the short and long term
objectives in a program/project (27:146). For example,
in the design of a new aircraft, the program/project man-
ager must insure that the short run objective is to pro-
duce a quality aircraft within the limits of his alloted

budget and schedule requirements. But also of equal importance is the Life-Cycle Cost long run objectives which determine the user's operating and support costs. Many program/project managers have been successful in achieving short run gains, only to find out later that the system became unsupportable in the field in terms of both cost and manhour expenditures (50:19).

Previous Research Efforts to Measure Conflict in a Project Management Environment

As stated previously, only two research teams found in the literature review attempted to actually measure the intensity of potential causes of conflict in a program/project environment. For the remainder of this chapter, a summary of the Evan and Thamhain/Wilemon researches will be presented.

Evan Research Findings

The primary purpose of Evan's research was to investigate some causes and consequences of several types of conflict in two research and development organizations, one in Government and one in industry (20:37). Leading up to Evan's study, it was only stressed by behavioral scientists that some types of conflicts were detrimental and other types were beneficial for the organization. Evan set out to determine what kinds of conflict were beneficial and/or detrimental to the performance of a research and development project. To conduct the research, Evan measured several forms of interpersonal and

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technical conflict with respect to the peers, subordinates,
and supervisors involved in the project (20:38). Evan
theorized that the growing trend towards teamwork, or
project efforts by complex technological organizations
would bring to the surface a host of new behavior pro-
blems not previously considered or emphasized (20:38).
The teamwork, or project approach to management provides
a built-in opportunity for a greater variety of con-
flicts to arise, such as those discussed earlier in this
chapter.

Evan hypothesized that technical conflict would
have a positive effect on project performance, whereas,
interpersonal conflicts would have a negative effect.
Technical conflict refers to the controversy which arises
over the objectives of a project and the means employed to
reach them. This type of conflict benefits creativity and
generates new perspectives on the problems at issue (20:39).
Interpersonal conflict was expected to be detrimental to
project performance because of its disruptive nature and
the fact that it does not lend itself as readily to ration-
al management (20:39).

The effects of interpersonal and technical con-
flicts with the three interfacing groups were measured by
Evan through a questionnaire survey addressing types of
conflict as being dysfunctional and technical conflict
as being beneficial to project performance was confirmed

by the analysis of the data obtained. It was also found
that interpersonal conflicts which occur between superiors
and subordinates were significantly higher than between
peers. Conflict concerning technical issues was higher
between peers in the team concept, but this conflict
produced perceived beneficial results towards meeting
the project goals (20:43). A difference was also noted
between the civilian and government groups. The civilian
group showed a lower degree of project loyalty and a higher
degree of professional loyalty than the government group.
This was attributed to the lesser degree of job security
found in civilian project efforts, whereas there is a
greater sense of job permanency attached to government
projects (20:43). Although the scope of the Evan research
was limited to only two project organizations, it was im-
portant in establishing that differences in conflict exist
between management of traditional functional organizations
and project organizations. It was also important in that
it showed that differences existed between civilian and
military project organizations, even though the organiza-
tional frameworks were similar (20:45).

Thamhain/Wilemon Research Findings

Thamhain and Wilemon picked up where Evan had left
off. They carefully selected several specific conflict
areas developed in the theory as being fundamental to
program/project accomplishment. They then examined the

the conflict intensities of these areas with each of five

interfacing groups involved with civilian program/pro-

jects (55:2). They went a step further and investi--

gated whether the degree of conflict in each of these

conflict areas varied in each of the specific project

life-cycle stages. Their purpose in doing this strati-

fication was summed up in their problem statement:

> Project managers frequently indicate that
> one of the requirements for effective perfor-
> mance is the ability to effectively manage vari-
> ous conflicts and disagreements which invariably
> arise in task accomplishment. While several
> research studies have reported on the general
> nature of conflict in project management, few
> studies have been devoted to the cause and
> management of conflict in specific project
> life-cycle stages. If project managers are
> aware of some of the major causes of disagree-
> ments in the various life-cycle phases, there
> is a greater likelihood that the detrimental
> aspects of these potential conflict situations
> can be avoided or minimized [56:31].

Their study continued by examining the various con-

flict-handling modes used by civilian program/project man-

agers to determine their effectiveness in minimizing con-

flict situations with project personnel, superiors, and

functional support departments. The research was based

upon a survey of program/project managers in over 100

technology-oriented companies, which included a variety

of aerospace, computer, construction, and research and

development organizations. The questionnaire was de-

signed to measure values on three variables: (1) the

average intensity of seven potential conflict determinants

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over the entire program/project life-cycle; (2) the intensity of each of the seven conflict sources in the four program/project life-cycle stages; and (3) the degree to which conflict resolution modes are used by program/project managers (56:32).

<u>Mean Conflict Intensity Over the Project Life-Cycle</u>. Program/project managers were asked by Thamhain and Wilemon to rank the intensity of conflict they experienced for each of the seven potential sources of conflict (See Table 1).
These seven potential sources of conflict were also ranked with respect to each of five interfacing groups, namely, subordinates, assigned project personnel, functional support departments, superiors, and team members (See Table 2).

Table 1

The Seven Sources of Conflict [56:32-33]

Conflict over Project Priorities. The views of
project participants often differ over the sequence
of activities and tasks which should be undertaken
to achieve successful project completion. Conflict
over priorities may occur not only between the pro-
ject team and other support groups but also within
the project team.

Conflict over Administrative Procedures. A number
of managerial and administrative-oriented conflicts
may develop over how the project will be managed;
i.e., the definition of the project manager's re-
porting relationships, definition of responsibi-
lities, interface relationships, project scope,
operational requirements, plan of execution, nego-
tiated work agreements with other groups, and pro-
cedures for administrative support.

Conflict over Technical Opinions and Performance
Tradeoffs. In technology-oriented projects, dis-
agreements may arise over technical issues, per-
formance specifications, technical tradeoffs, and
the means to achieve performance.

Conflict over Manpower Resources. Conflicts may
arise around the staffing of the project team with
personnel from other functional and staff support
areas or from the desire to use another department's
personnel for project support even though the per-
sonnel remain under the authority of their func-
tional or staff superiors.

Conflict over Cost. Frequently, conflict may devel-
op over cost estimates from support areas regarding
various project work breakdown packages. For ex-
ample, the funds allocated by a project manager to
a functional support group might be perceived as
insufficient for the support requested.

Conflict over Schedules. Disagreements may devel-
op around the timing, sequencing, and scheduling
of project related tasks.

Personality Conflict. Disagreements may tend to
center on interpersonal differences rather than on
"technical" issues. Conflicts often are "ego cent-
ered".

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Table 2

The Five Interfacing Groups with
the Program/Project (55:2)

Subordinates. Personnel that are directly assigned
to the program/project and working under the super-
vision of the program/project manager.

Assigned Program/Project Personnel. Personnel from
the functional departments who are temporarily as-
signed to the program/project on a "loaned" basis.

Functional Support Departments. In an organiza-
tion these arethe specialized departments from
which the program/project manager must obtain sup-
port for his program/project, i.e., the engineer-
ing office.

Superiors. This refers to the personnel to whom
the program/project manager is immediately responsi-
ble.

Team Members. This refers to the immediate team
members assigned to the project. Sometimes con-
flict may arise among the team members themselves
and the program/project manager may have to step
in and resolve the differences.

The rank-order findings of the conflict source

intensities over a civilian program's/project's total life-

cycle are summarized below:

1. Conflict over Schedules
2. Conflict over Project Priorities
3. Conflict over Manpower Resources
4. Conflict over Technical Opinions
5. Conflict over Administrative Procedures
6. Personality Conflict
7. Conflict over Cost

It was also found almost consistently throughout

all seven categories that the intensity of conflict is great-

est with functional support departments, followed by assigned

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personnel, team members, superiors, and lowest, with subordinates (55:4). For a graphical illustration of these results, See Figure 1.

Intensity of Specific Conflict Sources in Program/Project Life-Cycle Stages. Thamhain and Wilemon asked each program/project manager to rank the intensity of the seven potential sources of conflict in each of the four life-cycle stages. They identified the four generally accepted stages of program/projects for their study as: program/project formation, program/project buildup, main program/project phase and phaseout (2:53) (See Figure 2). A graphical summary of the relative intensity of conflict for each of the potential sources of conflict in the individual life-cycle stages is shown in Figure 3. Furthermore, the trend of conflict intensities over the four program/project life-cycle stages is provided in Figure 4.

Conflict Handling Modes. Thamhain and Wilemon listed five types of conflict resolution modes which they felt were used most often by all managers. These resolution modes, as identified originally by Blake and Mouton* in their research, are as follows:

Withdrawal. Retreating or withdrawing from an actual or potential disagreement.

Smoothing. Deemphasizing or avoiding areas of difference and emphasizing areas of agreement.

Compromising. Bargaining and searching for solutions which bring some degree of satisfaction to the parties in a dispute. Characterized

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*See Blake and Mouton [9]

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by a "give-and-take" attitude.

Forcing. Exerting one's viewpoint at the potential expense of another. Often characterized by competitiveness and a win/lose situation.

Confrontation. Facing the conflict directly which involves a problem-solving approach whereby affected parties work through their disagreements. [56:33]

The surveyed program/project managers were asked to rank-order a series of aphorisms originally developed by Lawrence and Lorsch (35:265). Each aphorism represented a mode of conflict resolution. They were used in lieu of naming the resolution modes themselves to avoid the potential bias that might be introduced by the mode descriptions (55:3). The purpose of scoring these proverbs was to measure the degree of strength at which a program/project manager adopts a particular mode in personal interface situations with program/project personnel, superiors, and supporting functional departments (55:3). The conflict resolution profile in Figure 5 illustrates the most and least important modes of conflict resolution as indicated by the measurements.

Figure 1. Relative Intensity of Conflict Perceived by Project Managers [55:11]. (Bars Represent the Average Conflict Intensity Measured for all Managers on a Four-Point Scale)
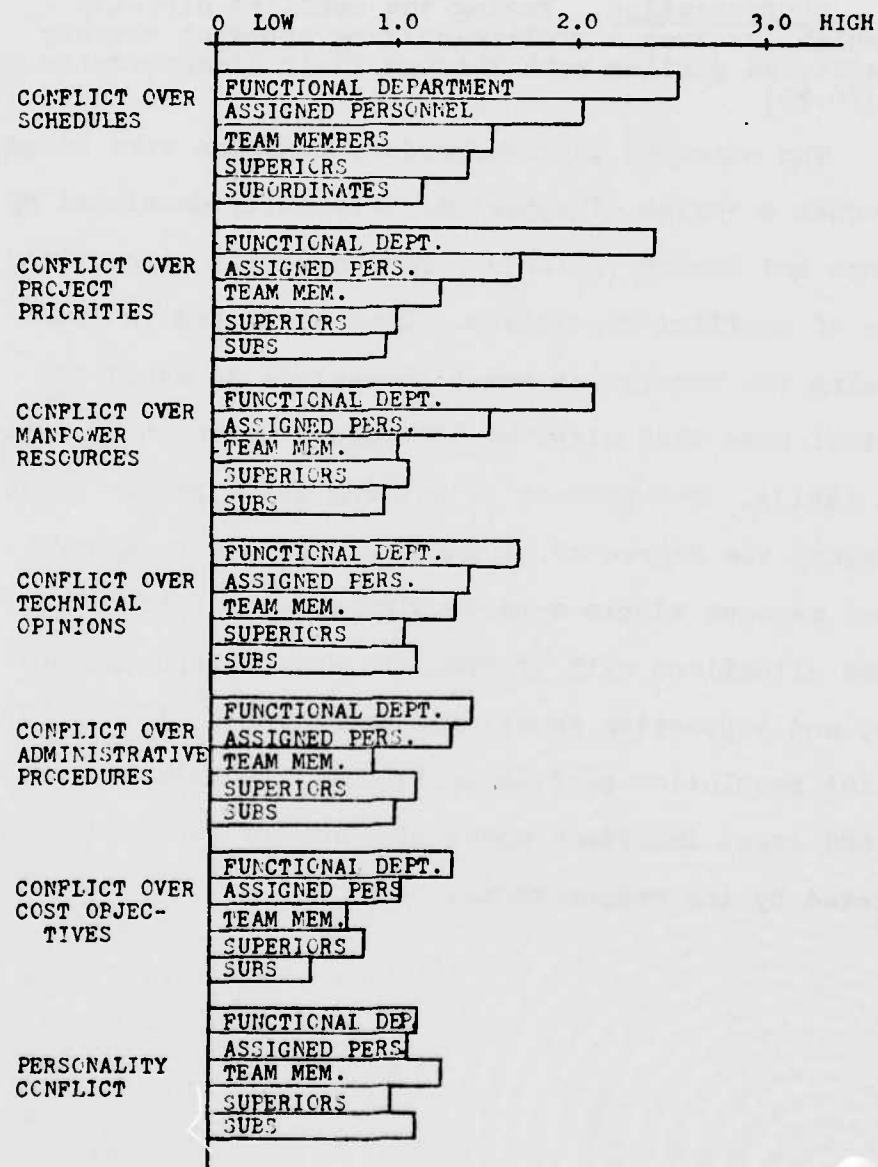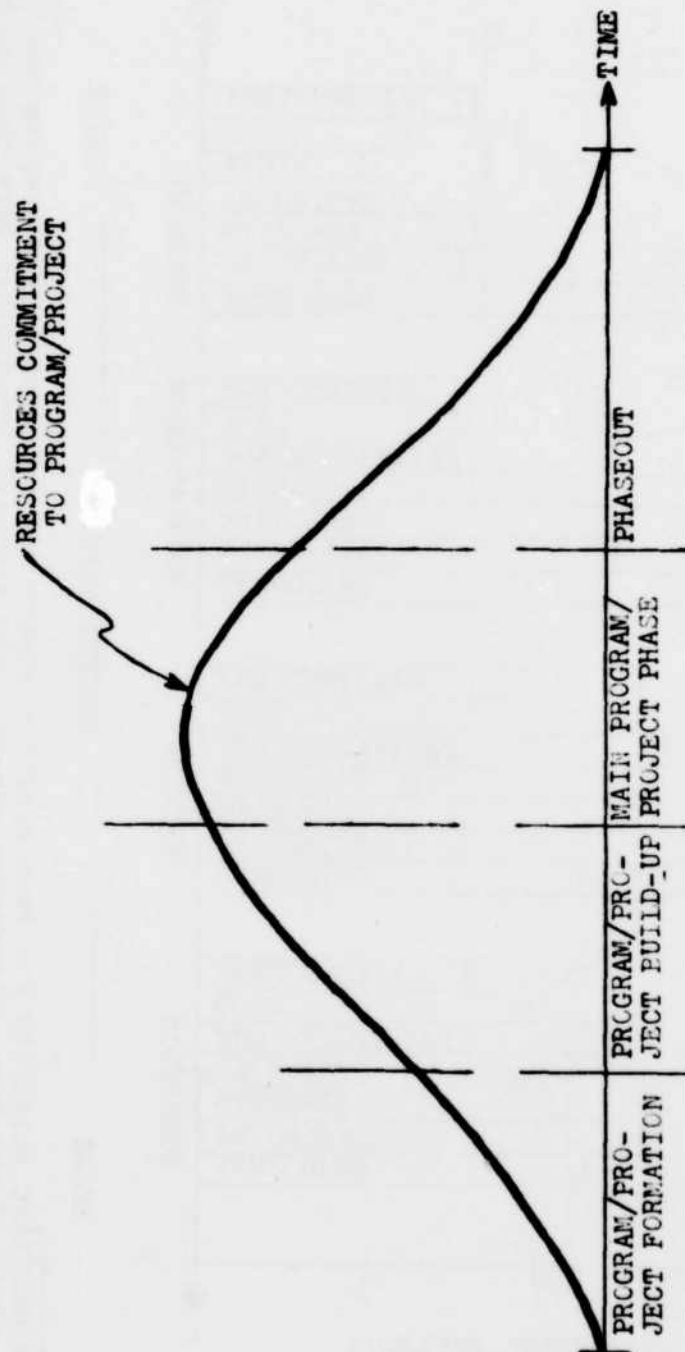
Figure 2. Stages of the Project life-Cycle.

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Figure 3. Relative Intensity of Conflict Over the Life-Cycle of Projects (56:38).
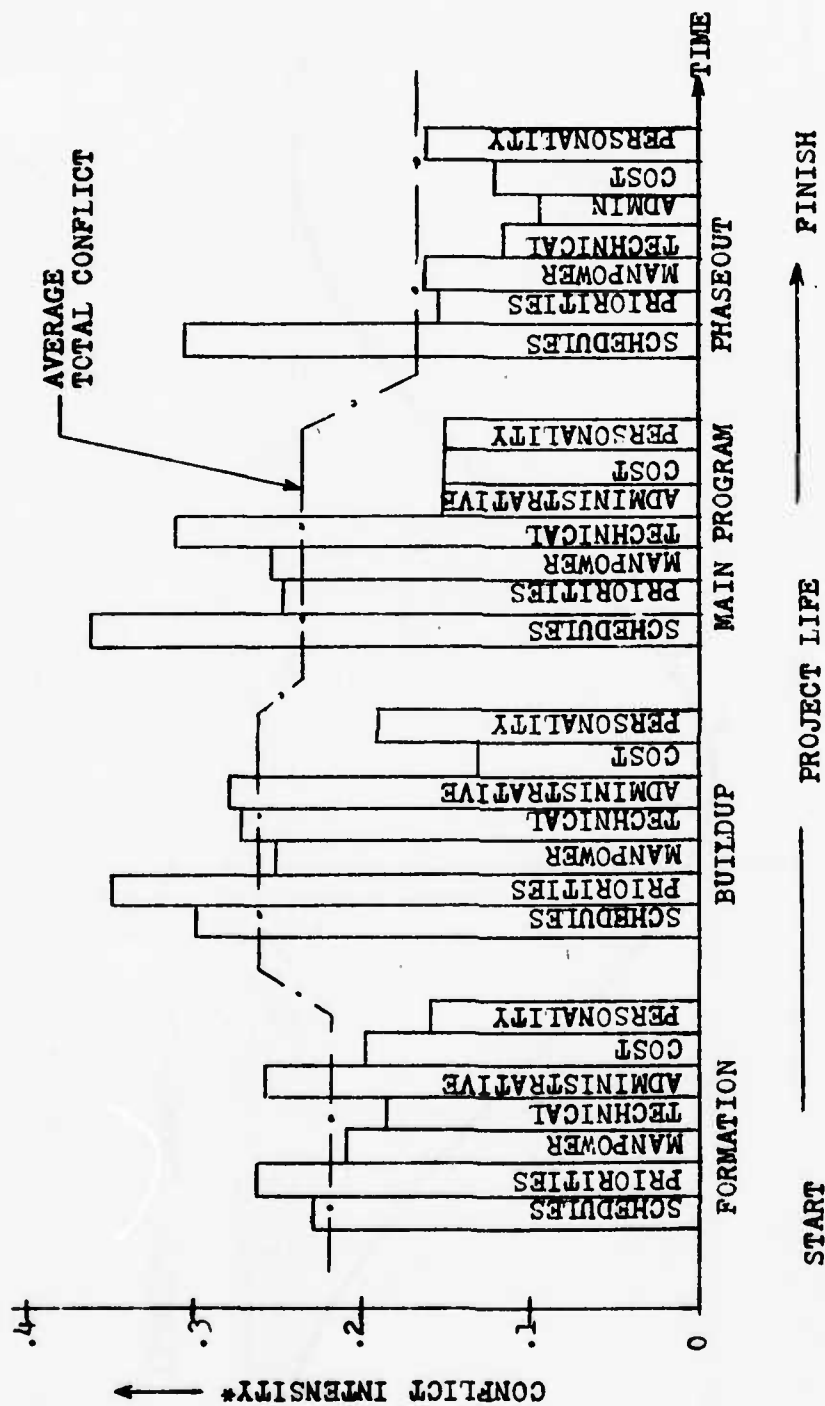
*The Conflict Intensity for each conflict source was calculated by averaging the intensities of the five interfacing groups. The averaged intensities were then multiplied by the total frequency of project managers who indicated the stage where "most" of this conflict occurred.
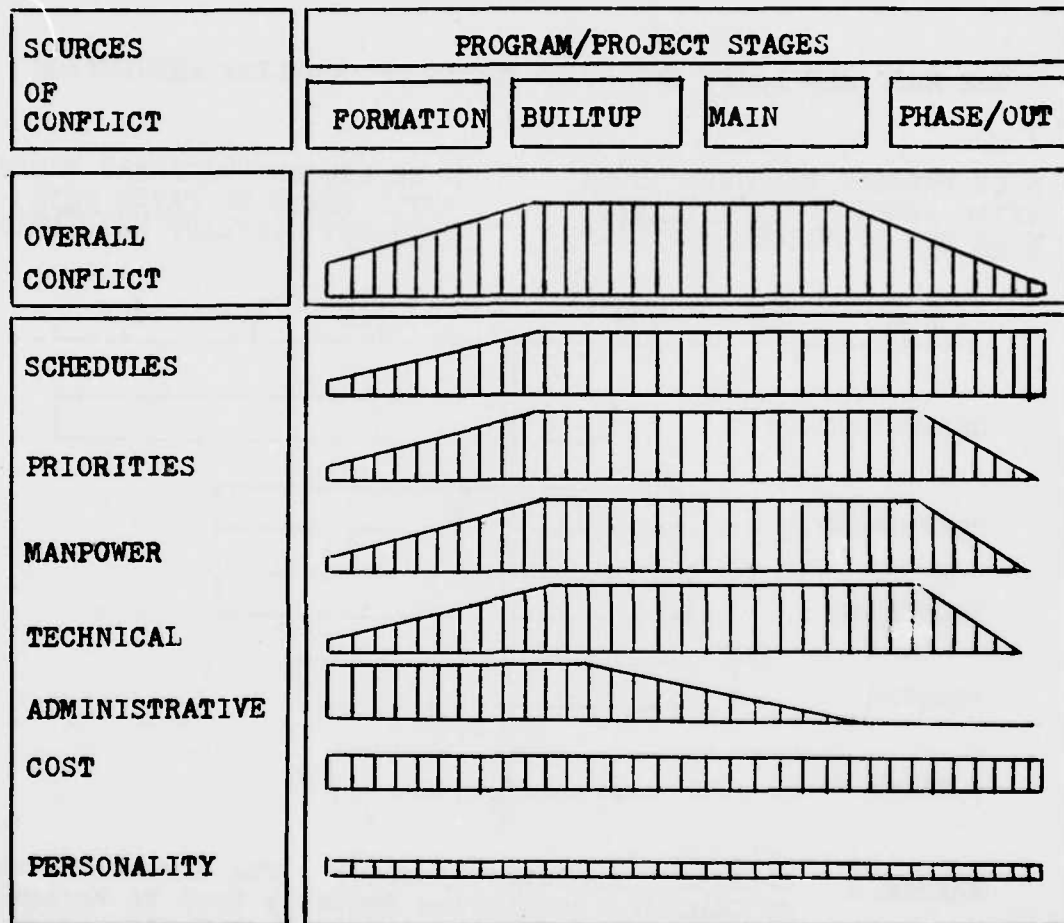
Figure 4. Trend of Conflict Intensity Over the Four Project Life-Cycle Stages [56:43].

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CONFLICT RESOLUTION PROFILE

THE MOST AND LEAST IMPORTANT MODES OF CONFLICT RESOLUTION

% OF PROJECT MANAGERS WHOSE
STYLE SEEMS TO REJECT THIS
MODE FOR CONFLICT RESOLUTION

% OF PROJECT MANAGERS WHOSE
STYLE SEEMS TO FAVOR THIS
MODE FOR CONFLICT RESOLUTION
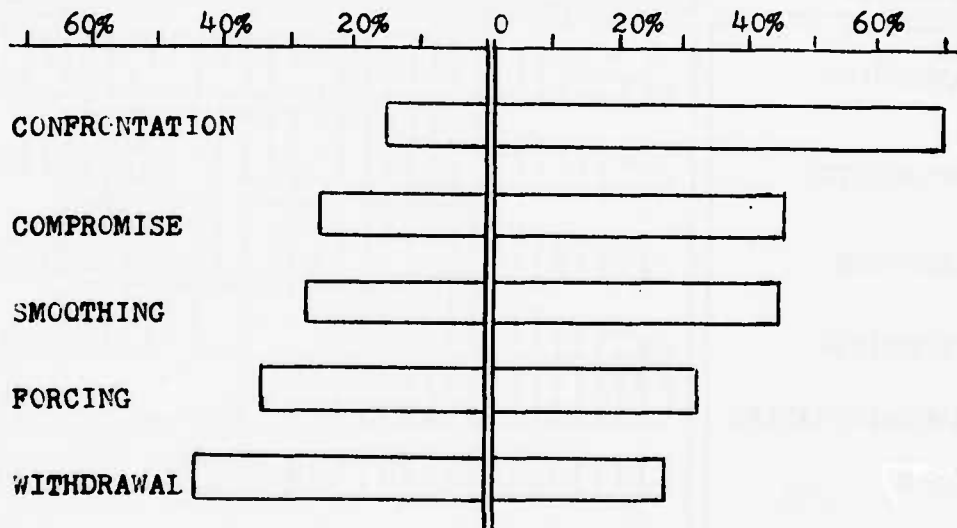
Figure 5. Conflict Resolution Profile (The Various Modes
of Conflict Resolution Actually Used to Manage
Conflict in Project-Oriented Work Environments
[56:45].)

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Basis for Further Research

The Evan and Thamhain/Wilemon research studies were directed primarily towards civilian program/project efforts. The question remains as to how their conclusions relate to an Air Force program management environment. That is essentially the basis for this research effort. The Air Force program manager and the civilian program/project manager accomplish basically the same job, but do so in different environments, with different experience, and under dissimilar incentive systems.

Research Hypotheses

Tests of the following research hypotheses provide the information necessary to conduct the comparison:

I. There is no difference in the intensities of conflict experienced by SPO managers and civilian program/project managers for each program/project life-cycle phase.

II. There is no difference in the use of conflict resolution modes by SPO managers and civilian program/project managers.

CHAPTER 3

RESEARCH METHODOLOGY

Introduction

As stated in Chapter 1, the objective of this re-
search was to measure the causes and intensity of conflict
experienced by SPO managers during the various phases of
the program life-cycle, and to determine the extent to
which a SPO manager uses the five modes of conflict resolu-
tion. These results were then to be compared with the
Thamhain/Wilemon research results. In order to make this
determination, the instrument used by Thamhain and Wilemon
was used to gather the same type of data on Air Force SPO
managers as was gathered in the Thamhain/Wilemon study of
civilian program/project managers. Aspects of the method-
ology and research design are discussed in this chapter.

Universe Description

The universe consisted of all <u>SPO managers</u>, both
civil service and military with the Air Force Systems Command,
involved in managing Air Force weapons system acquisition
programs. As <u>SPO manager</u> was previously defined, adminis-
trative and functional support personnel were excluded from
consideration/inclusion in the study.

The Population of Interest

The population of interest in this study is limited
to SPO managers within the Aeronautical Systems Division.

Program management within AFSC is centered primarily around
the three major divisions in the command. These three
divisions are (1) the Aeronautical Systems Division (ASD),
(2) the Space and Missile Systems Organization (SAMSO),
and (3) the Electronics Systems Division (ESD) (1:61).
Time and financial constraints dictated that the research
population be limited to only one of these divisions. The
proximity of ASD to the Air Force Institute of Technology's
School of Systems and Logistics, located at Wright-Patterson
Air Force Base, Ohio, made ASD the logical choice to sup-
port the study.

Our assumptions concerning the validity of the re-
sults in relation to all other Air Force program managers
were essentially the same as those considered by Lempke
and Mann in their research study:

> Because the population was necessarily limit-
> ed, the data producing sample of program managers
> is a sample of convenience. However, common
> policies and regulations in AFSC govern the se-
> lection of program managers throughout the command.
> Additionally, the military members of the popu-
> lation share a variety of common experiences,
> including professional education, military train-
> ing, and a multitude of military socializing
> influences. These results of this study may be
> applied to the broader population [37:37].

Sample Selection Plan

The sample of SPO managers for this research was
selected from all ASD SPO's which were identified with a
particular phase of the weapons system acquisition life-
cycle. A stratified random sample of at least fifty SPO

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managers was chosen from each of the program life-cycle phase categories. The sample size was selected in order to allow for incomplete questionnaires and non-responses, and yet permit the use of the central limit theorum.

A complete listing of program managers assigned to each SPO in the population was obtained from the individual SPOs. The listings were screened and those individuals not meeting the definition of SPO managers were eliminated. The remaining individuals were assigned a unique number for purposes of sample selection and control. A random number table was then used to select a sample of fifty SPO managers for each program life-cycle phase.

Description of Population Environment

The purpose of a SPO is to develop a particular system or subsystem for military use. Each SPO has a program direction, and the project team is drawn from various functional departments within the Air Force.

The SPO varies in size, depending on the particular system being acquired. At one end of the continuum is the "mini-SPO" such as the various subsystem SPOs. An example of a mini-SPO is the Recce/Strike SPO (3:37). This SPO consists of a number of small programs related to improving reconnaissance and target acquisition systems for both manned aircraft and remotely piloted vehicles. At the other end of the continuum are the so-called

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"super-SPOs" such as the F-16, B-1, and F-15 SPOs whose
missions involve development/acquisition of entire major
new weapon systems. A SPO may range in size from five
personnel in a mini-SPO upwards to two hundred personnel
in a super-SPO.

Variables Under Consideration

The variables in this study were the phase of the
weapons system acquisition life-cycle, potential sources
of conflict, interfacing groups, and conflict resolution
modes (See Table 3). The level of data for the variables
was discrete (limited) and the scale of measurement was
nominal. Each of these variables were rank-ordered and
the resulting data is on an ordinal scale. The use of
an ordinal scale implies a statement of "greater than"
or "less than" without our being able to state how much
greater or less. Correlations will thus require the use
of various rank-order methods known as nonparametric
techniques.

The weapons system acquisition life-cycle is divid-
ed into five distinct phases: (1) conceptual; (2) valida-
tion; (3) full-scale development; (4) production; and (5)
deployment. For the purpose of this thesis, the five phases
of a weapons system acquisition life-cycle were categorized
with respect to the four generally accepted life-cycle
stages of a civilian program/project. Using this compari-
son model, the dependent variables were isolated within

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similar categories of the life-cycle to allow a comparison between this study and the results of the Thamhain/Wilemon study. Grouping the five phases into the four stages researched by Thamhain and Wilemon was justified on the basis of the similarity in the nature of tasks and problems involved in each category (See Table 4).

Table 3

Variables Under Consideration

I. THE SEVEN POTENTIAL SOURCES OF CONFLICT (See p. 28)

Variable	Variable Description
S1	Conflict over Program Priorities
S2	Conflict over Administrative Procedures
S3	Conflict over Technical Opinions and Performance Tradeoffs
S4	Conflict over Manpower
S5	Conflict over Cost Objectives
S6	Conflict over Schedules
S7	Personality Conflict

II. THE SIX INTERFACING GROUPS WITHIN THE PROGRAM (See p. 46)

G1	Subordinates
G2	Assigned Program Personnel
G3	Functional Support Departments
G4	Superiors
G5	Spo Team Members
G6	Outside Agencies

III. CONFLICT RESOLUTION MODES (See p. 30)

M1	Withdrawal
M2	Smoothing
M3	Compromising
M4	Forcing
M5	Confrontation

IV. PHASES OF A SYSTEM ACQUISITION LIFE-CYCLE (See p. 44)

P1	Conceptual/Validation
P2	Full-Scale Development
P3	Production
P4	Deployment

Table 4

Categorization of Program Life-Cycle Phases (2:20)

CATEGORIES FOR STUDY	"MILITARY" LIFE-CYCLE PHASES	"CIVILIAN" LIFE-CYCLE STAGES	ACTIVITIES INVOLVED

I	CONCEPTUAL/ VALIDATION	FORMATION	1. Identify need
			2. Establish feasibility
			3. Prepare proposal
			4. Program characteristics valida-
			   ted and refined
			5. Program personnel identified and
			   scheduled

II	FULL-SCALE DEVELOPMENT	BUILDUP	1. Design system 2. Build and test prototype models 3. Approval for final production

III	PRODUCTION	MAIN PROGRAM	1. System production
			2. Logistical support activities
			   implemented
			3. Performance verified during
			   transition to the field

IV	DEPLOYMENT	PHASEDOWN	1. Other agencies assume responsi-
			   bility for new product
			2. Program effort decreases and
			   disbands
			3. Personnel reassigned

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Data Collection Instrument

The instrument used in this study to gather the sample data was developed by Thamhain and Wilemon for their study of conflict in civilian program/project work environments. In order to retain the validity associated with the study, only minor changes were made to the questions retained from the original instrument. Specifically throughout the questionnaire, the terminology was slightly altered to insure that the military sample would understand the intent of the questions. Several questions that were not applicable to an Air Force program environment were omitted. The only other change was the addition of a sixth interfacing group, outside agencies, in question 11. This was done to determine whether or not outside agencies, which continually interface with SPO managers, cause significant conflict situations. See Table 5 for SPO interfacing groups.

The instrument was then tested for clarity and comprehension by having several officers (within the School of Systems and Logistics) with SPO management experience complete and critique the response sheets. These responses were not used in the final analysis and no significant changes were needed to improve the questionnaire. The official collection of data did not start until after formal survey approval procedures had been completed. A copy of the approved instrument, as well as the approval letter is included in Appendix A.

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Table 5

The Six Interfacing Groups
in the SPO Program

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Subordinates. Personnel that are directly assigned
to the program and working under the supervision of
the program manager.

Assigned Program Personnel. Personnel from the func-
tional departments who are temporarily assigned to
the program on a "loaned" basis.

Functional Departments. In an organization these
are the specialized departments from which the pro-
gram manager must obtain support for his program,
i.e., the engineering office and the procurement
office.

Superiors. This refers to the personnel to whom the
program manager is immediately responsible.

Other SPO Members. These personnel are the other
program team members assigned to a SPO. In a Super-
SPO, this may refer to the various subsystem program
managers who must work together to deliver a final
product. In the smaller SPO's. this may refer to
other program managers on the same organizational
level upon which a program manager may have to de-
pend on for his own program's objectives.

Outside Agencies. This will include such outside
influences such as AFSC Headquarters, the user com-
mands, the Inspector General teams, and the host of
outside Air Force agencies that continually inter-
face with ASD program managers.

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Data Collection Method

Once the sample was determined, the questionnaire used to collect the data was handcarried to each SPO, where it was personally distributed by the researchers to each selected SPO manager. The purpose of using this distribution method was essentially the same as stated by Lempke and Mann in their study:

> 1. maximize response (reduce nonrespondent bias) by personally encouraging each subject to respond and by answering questions of an administrative nature concerning the questionnaire, and

> 2. acquire a "feel" for the SPO environment from which the data would come [37:39].

The respondents completed the questionnaire anonymously and mailed the responses directly back to the researchers. Strict confidentiality was maintained for all respondents at all times. Envelopes with return addresses were provided to expedite the mailing process.

Ranking of Sample Responses

The variable values needed to support or disprove the hypotheses were obtained primarily from questions 11 and 14 in the survey questionnaires (See Appendix A). All other questions were used to either support or refute reasons why certain conflict variables were ranked either high or low.

Question 11 provided the data needed to make statistical inferences regarding intensities of the potential sources of conflict for each of the six interfacing groups.

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The intensity of conflict experienced by program managers was measured on a grid specifically designed for the Thamhain/Wilemon study. Program managers were asked to indicate on a standard four-point scale the intensity of conflict they experienced for each of the seven causes of conflict with each of the six interface groups.

Once the information was collected, mean intensity scores for each interfacing group were computed for each of the seven sources of conflict. These averages were taken in order to rank the overall importance of the sources of conflict identified by the respondents. This method was the same as used in the study by Thamhain and Wilemon (55). However, the reader is cautioned that these averages are not averages in the true sense of the word, but instead are employed only to give a relative position to each of the sources of conflict and type of interfacing group. The source of conflict with the highest mean intensity value was then assigned a rank value of one, the second highest a two, and so on. Ties on rank responses were reconciled according to a procedure under which each tied response was assigned the average rank value for the ranks concerned (48:217-8).

Question 14 dealt with conflict resolution modes measured against the interfacing group variables. This set of measurements relied on the research of Lawrence and Lorsch (35:265), who developed various sets of aphorisms

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to describe methods of resolving conflict (See Table 6).
Fifteen of these aphorisms were selected to match the five
methods of conflict resolution described previously in
Chapter 2. These proverbs were used to avoid the poten-
tial bias that might be introduced otherwise by the use
of social science jargon (56:34). Their relative mean
scores were ranked by the same method described for the
data derived in question 11.

The existence of ordinal level data called for
the use of nonparametric statistics to test for relation-
ships (or differences) between variables and for the com-
parison of findings between civilian and Air Force program
management organizations.

For the purpose of analyzing the data from Air
Force SPO managers, the following tests were considered:

Test I. The intensity of each source of
conflict experienced by SPO managers does not
differ across the different program life-cycle
categories.

Test II. The intensity of each source of
conflict experienced by SPO managers does not
differ among specific interfacing groups.

Test III. The conflict resolution modes used
by SPO managers do not differ among specific in-
terfacing groups.

These tests are used to established relationships
within the data collected from the Air Force sample, in
preparation for comparing the Air Force results with those
of Thamhain and Wilemon on civilian program/project managers.

Table 6
Aphorisms Describing Five Modes of
Conflict Resolution

RESOLUTION MODE	APHORISM
Forcing	1. Might overcomes right 2. The arguments of the strongest always have the most weight 3. If you cannot make a man think as you do make him do as you think
Smoothing	1. Kill your enemies with kindness 2. Soft words win hard hearts 3. When one hits you with a stone, hit him with a piece of cotton
Confrontation	1. Come now and let us reason together 2. By digging and digging the truth is discovered 3. A man who will not flee will make his foe flee
Withdrawal	1. He who runs away lives to run another day 2. Don't stir up a hornet nest 3. When two quarrel he who keeps silence first is the most praiseworthy
Compromise	1. Better half a loaf than no bread 2. You scratch my back, I'll scratch yours 3. It is easier to refrain than to retreat from a quarrel

The Statistical Test for Correlation

The statistical test used in this research was the Kendall rank correlation coefficient, Tau. A review of Siegel's Nonparametric Statistics for the Behavioral Sciences (48) and the Statistical Package of the Social Sciences (SPSS) (44) revealed that the Kendall rank correlation is a most appropriate test for the correlations made in this study.

The Kendall rank correlation coefficient measures the degree of association between two arrays of ordinal measurements of a common group of items. The value for Tau is obtained by arranging one array in rank order and then examining the corresponding rank values for the second array (48:214). The procedure considers all possible pairs of rank values in the second array, adding to the value of Tau for values which are in natural order, subtracting for pairs out of order, and adjusting for ties in either array. If the arrays are in perfect agreement with no ties, the value of Tau is +1.00, indicating the maximum possible agreement. If the arrays are in reverse natural order with no ties, the value of Tau is -1.00. According to Siegel, Tau is a function of the minimum number of interchanges of ranks necessary to transform the second array into the same order as the first array and may be considered as a coefficient of disarray between two rankings (48:215).

The computation for Tau was based on the follow-ing formula (44:290):

$$Tau = \frac{S}{\sqrt{\frac{1}{2}N(N-1)-T_x} \sqrt{\frac{1}{2}N(N-1)-T_y}}$$

Where:

S=the sum of the product of indexes for each possible pair in each ranking. A pair in order has an index of +1. A pair tied has an index of 0. Thus a pair tied on either rank contributes nothing to S, whatever the sign of the other rank (48:216).

N=the total number of objects ranked.

$T_x = \frac{1}{2} \sum t(t-1)$, t being the number of ties on a specific rank in the first array, or X variable.

$T_y = \frac{1}{2} \sum t(t-1)$, t being the number of ties on a specific rank in the second array, or Y variable.

The significance of Tau is that if the two arrays of ranks are unrelated, any possible order of the second array is equally likely, each with an associated value for Tau. For values of N less than 8, specific tables have been cal-culated which determines the probability of Tau through the statistic S, of which Tau is a function (48:220).

The specific test of the null hypothesis is per-formed by comparing a value of the test statistic S for the rank order comparison to a critical value of S obtained from tables. The critical S value identifies the allowable probability of erroneously rejecting the null hypothesis when the null hypothesis is true.

In this formula, Tau and N are defined as they have been used previously. The denominator in this formula is

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the standard deviation of Tau. SPSS was used to perform
the calculations.

Rejection/Acceptance of Hypotheses

Each of the hypotheses were tested at the $\alpha = .05$
level of significance. Since a significant positive re-
lationship was considered to infer agreement (or no dif-
ference), the test was "one tailed", assigning the ac-
ceptable probability of error to the right tail of the
normal distribution. Rejection of the null hypotheses led
to the support of the alternate hypothesis. Rejection
of a null hypothesis is a stronger statement than is the
failure to reject. Failure to reject cannot be strictly
equated with acceptance. This leads to a tendency to state
"the other side" of the researcher's thoughts often con-
strained by the nature of the conclusions which can be
drawn from existing statistical tests (48:14).

The specific hypotheses considered for each com-
parison in this study were derived from the tests for anal-
ysis of sample data and from the research hypotheses of
this study. In each of the following stated hypotheses,
the variables are defined as they are listed in Table 3,
page 43. The hypotheses are explained by the following
statistical testings:

1. Test I. The intensity of each source of con-
flict experienced by SPO managers does not differ signi-
ficantly across the different program life-cycle categories.

Null Test Hypothesis: The ranking of S1, S2,
S3, S4, S5, S6, and S7 for Pi differs from the
corresponding ranking for Pj (i and j=1, 2, 3,
4 and i≠j).

Alternate Test Hypothesis: The rankings do
not differ.

To evaluate Test I, six null hypothesis which con-

sidered all possible combinations between Pi and Pj were

tested. If the null hypotheses were all rejected, Test

I was supported. If Test I is supported by any of the

tests this would indicate that there is a difference be-

tween SPO managers and civilian program/project managers.

This would be true because the results of the Thamhain/

Wilemon research indicated that the rankings differed in

each of the life-cycle stages (See Figure 3, page 34).

This would also indicate that Research Hypothesis I is

not supported for each of the phases. These tests also

indicate where there are similarities among the differ-

ent program phases when the null is rejected, or dissim-

ilarities when accepted.

2. Test II. The intensity of each source of con-

flict experienced by SPO managers does not differ among

specific interfacing groups.

Null Test Hypothesis: The ranking of S1, S2,
S3, S4, S5, S6, and S7 for Gi differs from the
corresponding ranking for Gj (i and j=1, 2, 3,
4, 5, 6 and i≠j).

Alternate Test Hypothesis: The rankings do
not differ.

To evaluate Test II, fifteen null hypotheses which

considered all possible combinations between Gi and Gj were

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tested. If the null hypotheses are rejected, Test II was supported. Support indicates where possibilities of similarities exist between interfacing groups with respect to sources of conflict in the military environment and non-support indicates dissimilarities.

3. Test III. The conflict resolution modes used by SPO managers do not differ among specific interfacing groups.

Null Test Hypothesis: The ranking of M1, M2, M3, M4 and M5 for Gi differs from the corresponding ranking for Gj (i and j=2, 3, 4, and i≠j). G2 included subordinates, assigned personnel, and other SPO members.

Alternate Test Hypothesis: The rankings do not differ.

To evaluate Test III, three null hypotheses which considered all possible combinations between Gi and Gj were tested. If the null hypotheses were rejected, Test III was supported. Like Test II, support indicated possibilities and similarities and non-support dissimilarities.

4. Research Hypothesis I. There is no difference in the intensities of conflict experienced by SPO managers and civilian program/project managers for each program/ project life-cycle category.

Null Hypothesis: The ranking of S1, S2, S3, S4, S5, S6, and S7 for SPO managers differs from the corresponding ranking for civilian program/project managers for each Pi (i=1, 2, 3, 4).

Alternate Hypothesis: The rankings do not differ.

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To evaluate Research Hypothesis I, four null hypotheses were tested. If the null hypotheses were rejected, then Research Hypothesis I was supported. If all four null hypotheses were rejected, this would indicate that the SPO managers and civilian program/project managers are very similar and that each came from the same population. If there is a combination of support and non-support, or total non-support of the Research Hypothesis I, both of these managers are probably not from the same population. Similarities would be reflected by support and non-support areas of the Research Hypothesis I, respectively.

5. Research Hypothesis II. There is no difference in the use of conflict resolution modes by SPO managers and civilian program/project managers.

Null Hypothesis: The ranking of M1, M2, M3, M4 and M5 for SPO managers differs from the ranking for civilian program/project managers.

Alternate Hypothesis: The rankings do not differ.

Rejection of the null hypothesis would support Research Hypothesis II that SPO managers and civilian program/project managers use conflict resolution modes in a similar manner.

Assumptions of the Study

1. The data to be collected is based on perceptions. It is assumed that the data to be gathered and the information obtained from it is representative of the true relationships that exist.

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2. It is assumed that the sample of SPO managers is representative of the population of SPO managers assigned to system program offices within the Aeronautical Systems Division.

3. It is assumed that each respondent answered each question independently, and the responses are reflective of his true feelings.

4. It is assumed that the difference in various SPO organizational levels has no bearing on the data to be gathered.

5. In order to permit statistical testing and comparisons, the Thamhain/Wilemon study was assumed to have been accomplished in a professional manner, and the results reported accurately reflect the data they obtained.

6. Definitions and assumptions from supportive research studies were valid and reasonable. For example, the stratification of the program life-cycles were logically and sufficiently defined to allow comparisons between civilian and Air Force programs/projects.

Limitations of the Study

1. The study is limited to the various system program offices in ASD at Wright-Patterson Air Force Base, Ohio.

2. The results of this study may be formally generalized only to system program offices within the Air Force Systems Command.

3. Validity of the results comparing the data collected in this study to that collected by Thamhain and

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Wilemon is limited by the validity of results reported by
Thamhain and Wilemon in their articles.

CHAPTER 4

DATA ANALYSIS AND INTERPRETATION

The data analysis was accomplished in four parts.
First, the collected data was examined to determine that
the survey forms were understood and properly completed.
During this effort the response rate was analyzed. Second,
the data itself was analyzed to determine the implications
it contained about the Air Force SPO managers. Third, the
findings were compared with findings published in the
civilian literature to determine if the military findings
parallel those from the civilian environment. Finally,
additional analysis was conducted to further explain the
conclusions of the study.

PART I. RESPONSE RATE

Of the 200 questionnaires sent to twenty-three
SPOs located throughout ASD, 151 were returned represent-
ing a 75% response rate overall. Of these, 15 were incom-
plete or filled out incorrectly and were thus unuseable
for purposes of analysis. The remaining 136 questionnaires
represented a 68% useable response rate. These responses
were quite evenly distributed across the categories and
sufficiently numerous to support an analysis of the null/
alternate hypotheses. The distribution of responses by
categories is depicted in Table 7.

Table 7

Response Rate by Program Life-Cycle Category

CATEGORY*	SENT	RECEIVED	USEABLE	% RESPONSE	% USEABLE
I	50	36	30	72%	60%
II	50	44	42	88%	84%
III	50	36	32	72%	64%
IV	50	35	32	32%	64%
TOTAL	200	151	136	75.5%	68%

*The categories refer to the life-cycle phases/stages described on page 44.

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PART II. INTERNAL DATA ANALYSIS

The internal data analysis includes the three tests of the data collected to understand the military environment. These tests were used to establish relationships within the data collected from SPO managers, in preparation for comparing the Air Force results with those of Thamhain and Wilemon in the Research Hypothesis.

Test I. The intensity of each source of conflict experienced by SPO managers does not differ significantly across the different life-cycle categories.

The objective of this test was to determine whether the emphasis on the sources of conflict was similar or dissimilar within each life-cycle category. It provided a means of determining whether any changes were taking place with respect to conflict intensities for each conflict source as the program life-cycle was progressing. The findings of this test allowed further testing in the Research Hypothesis I comparison with the civilian findings.

The relative intensities of the seven sources of conflict were rank ordered one through seven by category, with the highest relative intensity having the rank of one. These rankings are presented in Table 8. Test 1 was analyzed using the null/alternate hypotheses tests of Kendall Tau between the rankings by categories.

Null Hopothesis, Ho: The rankings disagree.

Alternate Hypothesis, H_1: The rankings agree.

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Table 8

Ranked Sources of Conflict by Category[1]

CATEGORY[2]	PROGRAM PRIORITIES	ADMINIS-TRATIVE	TECHNICAL ISSUES	MANPOWER RESOURCES	COST OBJECTIVES	SCHEDULES	PERSONALITY
I	2	5	3	1	6	4	7
II	1	5	2	2	6	4	7
III	1	2	3	4	6	5	7
IV	1	2	4	5	6	3	7

[1]The relative intensities of seven sources of conflict were rank ordered one through seven by category with the highest relative intensity having the rank of one.

[2]Category refers to life-cycle phases/stages described on page 44.

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The results of the null/alternate hypothesis tests are presented in Table 9.

Test I Interpretation of Results. The results did not support Test I overall. Rejection of three null hypotheses occurred where two categories were adjacent to each other. This means that there are similarities in perceptions of conflict. However, there were no rejections of null hypotheses for categories not adjacent to each other. From the viewpoint of the entire life-cycle, the pattern of rejection indicates that perceptions of conflict change over the entire life-cycle, but at a rate which does not demonstrate significant differences between adjacent categories. This trend and non-support of Test I lends support for Research Hypothesis I. Further interpretation of dissimilarities between categories will be discussed in the interpretation of the Research Hypothesis I findings.

> Test II. The intensity of each source of conflict experienced by SPO managers does not differ among specific interfacing groups.

The objective of this test was to determine whether differences in conflict intensities varied between the six interfacing groups for the seven sources of conflict. The rankings for the conflict sources indicate where similarities exist between specific interfacing groups within the military environment.

Table 9

Similarities and Dissimilarities of Ranked Sources of Conflict
Between Categories

CATEGORIES[1]	KENDALL TAU	PROBABILITY OF OCCURRENCE UNDER H_o	$\alpha = .05$	
			CANNOT REJECT	REJECT
I & II	.878	.003		X
I & III	.524	.051	X	
I & IV	.333	.147	X	
II & III	.683	.017		X
II & IV	.488	.064	X	
III & IV	.809	.005		X

[1]Categories refer to life-cycle phases/stages described on page 44.

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The relative intensities of the seven sources of conflict were ranked from one to seven for each of the specific interfacing groups with the highest relative intensity having the rank of one (See Table 10). Test II was analyzed using null/alternate hypothesis tests of Kendall Tau between the rankings by specific interfacing groups.

Null Hypothesis, Ho: The rankings disagree.

Alternate Hypothesis, H_1: The rankings agree.

The results of the null/alternate hypothesis tests are presented in Table 11.

Test II Interpretation of Results. Test II was not supported by the null/alternate hypothesis tests, five out of fifteen tests having rejected the null hypothesis. However, from the viewpoint of the organizational relationships between the SPO managers and the interfacing groups, the results of the hypothesis tests revealed an aggregation of the interfacing groups. These represented three organizational classes existing internally and externally to any particular program within ASD. The internal class included subordinates, assigned personnel, and other SPO members, all of whom could fall directly under the SPO manager's supervision or influence. The external class included functional departments, superiors, and other SPO members, all of whom belong to ASD (the parent organization), but not under the direct control of the SPO manager.

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Table 10

Ranked Sources of Conflict by Interfacing Groups

INTERFACING GROUP[2]	SOURCES OF CONFLICT						
	PROGRAM PRIORITIES	ADMINIS- TRATIVE	TECHNICAL ISSUES	MANPOWER RESOURCES	COST OBJECTIVES	SCHEDULES	PERSONALITY
SUBORDINATES	3	2	1	5	7	4	6
ASSIGNED PERSONNEL	1	3	2	4	7	5	6
FUNCTIONAL DEPARTMENTS	2	3	5	1	6	4	7
SUPERIOR	3	2	4	1	6	5	7
OTHER SPO MEMBERS	1	2	4	3	6	5	6
OUTSIDE AGENCIES	1	4	3	6	4	2	7

[1] The relative intensities of seven sources of conflict were rank ordered one through seven by interfacing groups with the highest relative intensity having the rank of one.

[2] Interfacing groups are described in more detail on page 46.

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Table 11

Similarities and Dissimilarities of Ranked Sources of Conflict Between Interfacing Groups

CLASS	INTERFACING GROUPS	KENDALL TAU	PROBABILITY OF OCCURRENCE UNDER H_0	$\alpha = .05$	
				CANNOT REJECT	REJECT
INTERNAL (GROUPS UNDER DIRECT SPO MGR CONTROL)	SUBORDINATES & ASSIGNED PERS.	.71	.01		X
	OTHER SPO MEMBERS & ASSIGNED PERS.	.78	.01		X
EXTERNAL (GROUPS WITHIN ASD PARENT ORGANIZATION NOT UNDER DIRECT SPO MGR CONTROL)	FUNCTIONAL & SUPERIORS	.81	.01		X
	OTHER SPO MEMBERS & FUNCTIONAL DEPARTMENT	.68	.02		X
	OTHER SPO MEMBERS & SUPERIORS	.68	.02		X
OTHER COMPARISONS BETWEEN INTERNAL AND EXTERNAL CLASSES	SUBORDINATES & FUNCTIONAL	.14	.33	X	
	SUBORDINATES & SUPERIORS	.33	.15	X	
	SUBORDINATES & OTHER SPO MEMBERS	.48	.06	X	
	ASSIGNED PERS. & FUNCTIONAL	.43	.09	X	
	ASSIGNED PERS. & SUPERIORS	.43	.09	X	
OTHER (GROUPS OUTSIDE ASD)	OUTSIDE AGENCIES & SUBORDINATES	.33	.15	X	
	OUTSIDE AGENCIES & ASSIGNED PERS.	.43	.09	X	
	OUTSIDE AGENCIES & FUNCTIONAL DEPARTMENT	.24	.23	X	
	OUTSIDE AGENCIES & SUPERIORS	.05	.44	X	
	OUTSIDE AGENCIES & OTHER SPO MEMBERS	.29	.18	X	

Note that the other SPO members group can belong to either
the internal or external group, depending on the type of
SPO or the situation. The other class included outside
agencies which are totally external to the ASD work environ-
ment.

For internal classes, the three interfacing groups
were compared with each other and they rejected the null
hypotheses indicating similarities (See Table 11). Also,
comparisons of these three groups with other interfacing
groups did not reject the null hypotheses indicating dis-
similarities. Assigned personnel, normally collocated with
the SPO manager, are apt to be more dedicated to the pro-
gram than those not directly assigned to the program. Thus,
the SPO manager's perception of conflict for subordinates
and assigned personnel would tend to be similar as the hy-
pothesis tests indicated. Likewise, the SPO manager's
perception of conflict with other SPO members within the
same program can be expected to be similar.

Distinct from the internal program class was the
external class within ASD which included superiors, func-
tional departments and other SPO members. The SPO manager
may be dependent upon any one of these interfacing groups
for support or resources in contrast to the internal class
over whom the SPO manager can probably exercise direct
supervision or influence. Like the internal class, the
external classing was supported by rejection of the null
hypotheses indicating similarities with the SPO manager's

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perception of conflict.

The only interfacing group which could not be
classified with either the internal or external classes
was outside agencies. The null hypothesis was not reject-
ed in any of the tests indicating dissimilarities in the
SPO manager's perception of conflict with the other class
(See Table 11).

The non-rejection of the null hypotheses which in-
cluded outside agencies indicates a totally different set
of orientations for this interfacing group. The goals
or orientations of outside agencies may not be consistent
with the goals that SPO managers are attempting to achieve
within the program work environment.

To summarize, the Test II results indicated a
combination of support and non-support for the null hy-
pothesis, but did not support the Test overall. There
are distinct differences between the rankings of the
seven sources of conflict within the three classes of:
(1) personnel working under the SPO manager's supervi-
sion; (2) personnel within ASD upon which the SPO man-
ager may be dependent; and (3) outside agencies. Some
of these differences will be discussed in the interpre-
tation of the results in Research Hypothesis I.

Test III. The conflict resolution modes
used by SPO managers do not differ among
specific interfacing groups.

The objective of this test was to determine
whether or not the SPO manager used different modes of

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conflict resolution to deal with the same three inter-
facing groups that Thamhain and Wilemon had used in their
study. For this reason, the outside agencies interfacing
group was excluded from the test.

The five conflict resolution modes were ranked
from one to five for each of the three interfacing groups,
with the most often used of the five modes having the rank
of one. The three interfacing groups were program per-
sonnel (which included subordinates, assigned personnel,
and other SPO members), functional departments, and su-
periors. Test III was analyzed using three null/alter-
nate hypothesis tests of Kendall Tau between the rank-
ings for each interfacing group.

Null Hypothesis, Ho: The rankings disagree.

Alternate Hypothesis, H_1: The rankings agree.

The rankings for all three of the interfacing groups
were the same as follows:

Ranking	Mode of Resolution
1	Confrontation
2	Compromise
3	Smoothing
4	Forcing
5	Withdrawal

The hypothesis tests yielded Tau values of 1.0, in-
dicating complete agreement in rankings, and rejection of
the null hypothesis with a 0.0 probability of occurence
under Ho.

Test III Interpretation of Results. The complete agreement
of the rankings and subsequent rejection of the null

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hypothesis supported Test III that conflict resolution
modes used by SPO managers do not differ among specific
interfacing groups. However, several observations cast
doubts upon the validity of the results. The data was
obtained from the last question on the survey question-
naire (See question 14, Appendix A, page 125). The re-
spondents were asked to determine the appropriateness
of fifteen proverbs equated to five modes of resolution
against three interfacing groups. The length of this
question, following an already long and complicated
survey, apparently resulted in a respondent tending to
give each interfacing group the same ratings for each pro-
verb. Construction of the instrument made it easy to
standardize the answers in this manner.

A more meaningful comparison might have been to
evaluate the use of conflict resolution modes in each of
the program life-cycle categories. The trend of resolu-
tion mode usage over the four life-cycle categories is
shown in Figure 6. This trend indicates that the SPO
manager uses differing styles of management throughout
the life-cycle of his program. In Category I, for exam-
ple, the resolution modes used indicates a relatively
high level of participative management. There is a de-
creasing tendency to use the forcing mode, and an in-
creasing tendency to use the withdrawal and smoothing
modes. However, as the program matures through Categories
II and III, a trend towards a more authoritarian or formal

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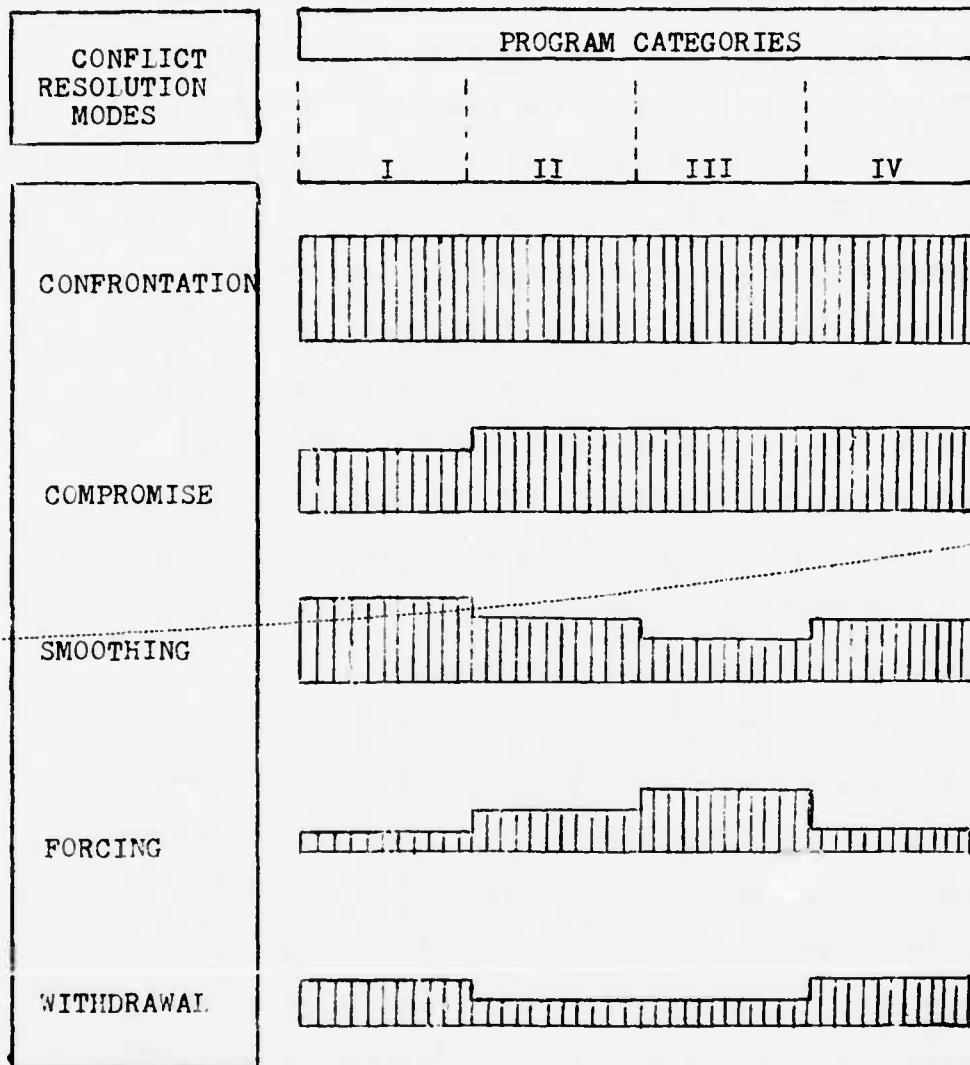
Figure 6. Trend of Conflict Resolution Modes Over the Four Life-Cycle Stages (Based on rank-ordered importance, 1 being highest usage and 5 being lowest usage).

style of management develops. The forcing mode usage increases, while smoothing and withdrawal show proportional decreases. Then in Category IV, a reversal occurs toward a more participative management style again. These findings of Larson and Ruppert in their 1975 thesis effort (32:57). Their study of SPO organizational climates across program life-cycle categories concluded that SPOs in Category I have a tendency to practice a form of participative management. As programs moved through Categories II and III, the SPO became a more formally structured organization. The reversal noted above in Category IV was also demonstrated in their thesis. This may be due to the fact that as the SPO becomes smaller, the SPO management typically becomes less *functionally* oriented in Category IV. Managers are again required to move more across organizational lines to accomplish their tasks and practice a style of participative management.

PART III. RESEARCH HYPOTHESIS ANALYSIS

Research Hypothesis I. There is no difference in the intensities of conflict experienced by SPO managers and civilian program/project managers for each program/project category.

By category, the relative intensities of the seven sources of conflict were ranked with the highest relative intensity having the rank of one. Similarly, the civilian rankings were derived from the Thamhain and Wilemon study (See Table 12). Research Hypothesis I was analyzed using null/alternate hypothesis tests of Kendall Tau between the

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civilian and SPO managers by categories.

Null Hypothesis, Ho: The rankings disagree.

Alternate Hypothesis, H_1: The rankings agree.

The results of the null/alternate hypothesis tests are presented in Table 13.

Hyp. I Interpretation of Results. The differences in the trends and intensities of conflict experienced by SPO managers and civilian program/project managers can be clearly shown in Figures 7 through 13. The findings did not support the Research Hypothesis that the conflict intensities within civilian and military life-cycle categories were similar. The overall findings of the conflict intensities over a SPO program's entire life-cycle are summarized below in rank-ordered sequence:

    1. Conflict over Program Priorities
    2. Conflict over Technical Opinions and Performance Tradeoffs
    3. Conflict over Administrative Procedures
    4. Conflict over Manpower Resources
    5. Conflict over Schedules
    6. Conflict over Cost Objectives
    7. Personality Conflict

1. Conflict over Program Priorities. In civilian programs/projects, priorities tend to be a form of conflict most likely to occur early in the life-cycle. According to Thamhain and Wilemon, numerous program/project managers had indicated that this type of conflict frequently developed in the initial categories because the organization's functional departments had no prior experience with a project undertaking (56:34). Thus, priority conflicts often

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Table 12

Ranked Sources of Conflict by Type Program Manager and Category

CATE-GORY[2]	TYPE PROGRAM MANAGER	SOURCES OF CONFLICT[1]						
		PROGRAM PRIORITIES	ADMINIS-TRATIVE	TECHNICAL ISSUES	MANPOWER RESOURCES	COST OBJECTIVES	SCHEDULES	PERSONALITY
I	CIVILIAN	1	2	6	4	5	3	7
	SPO MANAGER	2	5	3	1	6	4	7
II	CIVILIAN	1	3	4	5	7	2	6
	SPO MANAGER	1	5	3	2	6	4	7
III	CIVILIAN	4	5	2	3	6	1	7
	SPO MANAGER	1	2	3	4	6	5	7
IV	CIVILIAN	4	7	6	3	5	1	2
	SPO MANAGER	1	2	4	5	6	3	7

[1]The relative intensities of seven sources of conflict were rank ordered one through seven by civilian and SPO managers for each category with the highest relative intensity having the rank of one. For the civilian manager, Figure 3, page 34, was used.

[2]Category refers to life-cycle phases/stages described on page 44.

Table 13

Similarities of Ranked Sources of Conflict Between Civilian and SPO Managers

CATEGORY[1]	TYPE PROGRAM MANAGER	KENDALL TAU	PROBABILITY OF OCCURRENCE UNDER H_o	α = .05	
				CANNOT REJECT	REJECT
I	CIVILIAN & SPO MANAGER	.33	.15	X	
II	CIVILIAN & SPO MANAGER	.48	.06	X	
III	CIVILIAN & SPO MANAGER	.10	.38	X	
IV	CIVILIAN & SPO MANAGER	-.24	.23	X	

[1] Category refers to life-cycle phases/stages described on page 44.

SOURCES
OF
CONFLICT

AIR FORCE

CIVILIAN

CATEGORIES

CATEGORIES

I II III IV

I II III IV

PRIORITIES

TECHNICAL
ISSUES

ADMINISTRATIVE
PROCEDURES

MANPOWER

SCHEDULES

COST

PERSONALITY
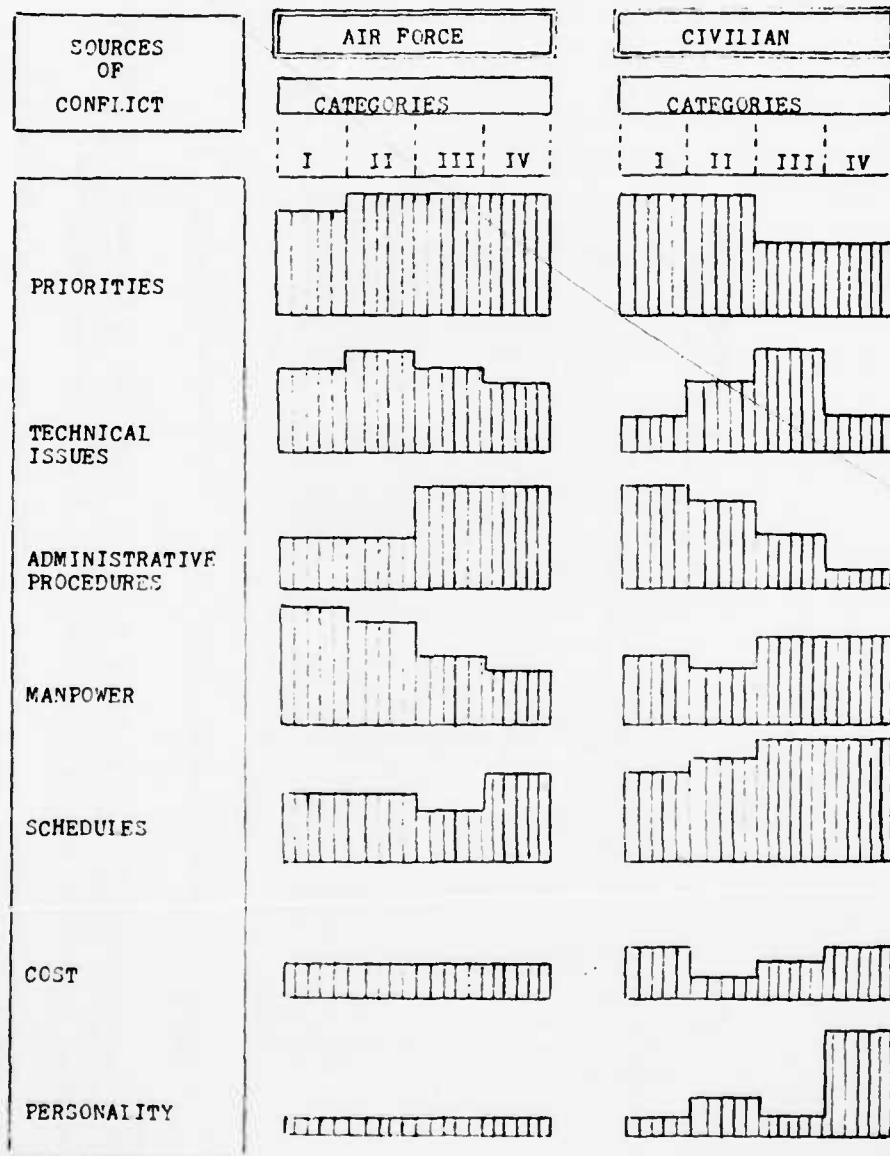
<u>Figure 7</u>. Comparison of the Trends of Conflict Source In-
tensities Over the Four Life-Cycle Categories
in Air Force Programs and Civilian Program/Pro-
jects (Conflict Profiles are Based on the Rank-
Ordered Trends).

Figure 8. Relative Intensities of Conflict Over the Life-Cycle of Air Force Programs
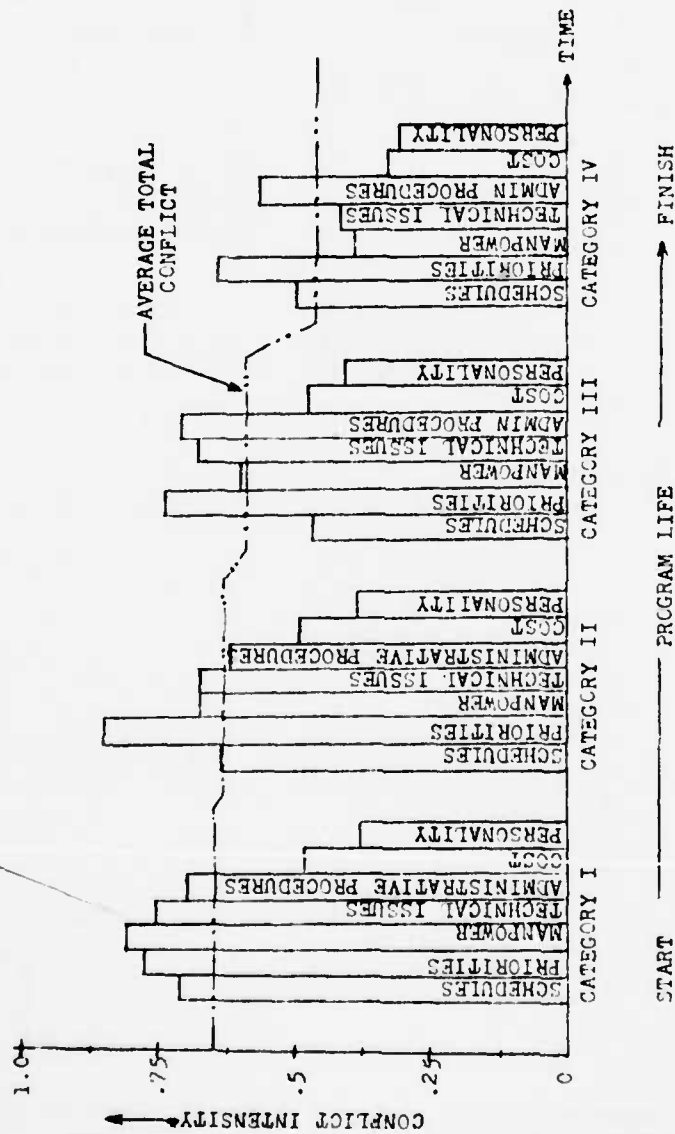
*The Conflict Intensity for each conflict source was calculated by averaging the conflict intensities of the six interfacing groups within a category. See Figures 10 through 13 for conflict intensities of each interfacing group within the four categories.

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Figure 9. Comparison of the Relative Intensities of Conflict Over the Total Life-Cycle of Air Force and Civilian Programs.
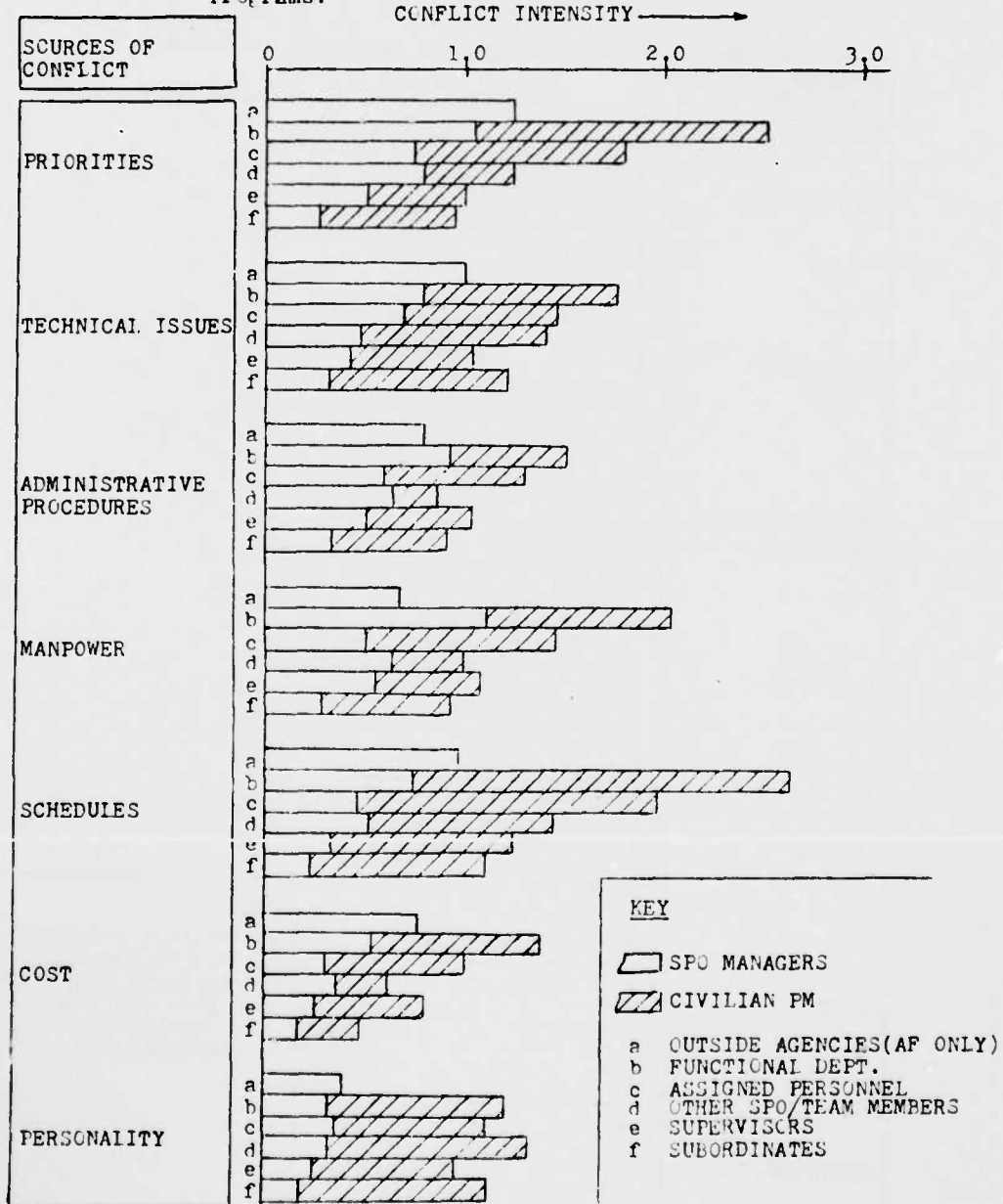
79
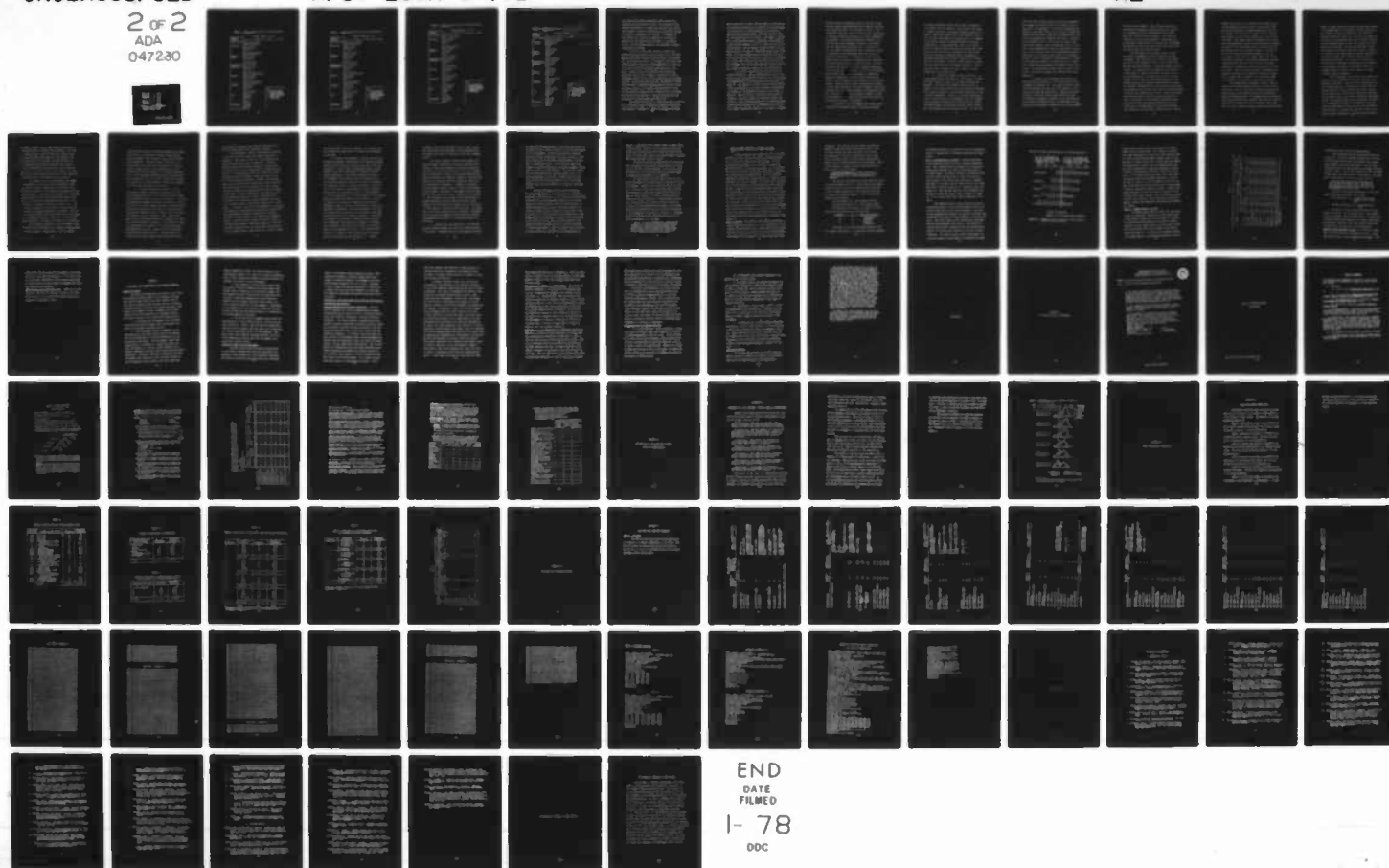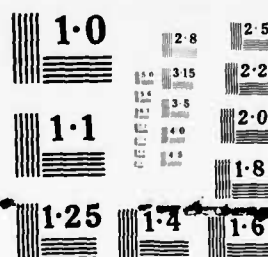
Figure 10. Conflict Intensity Profile of Interfacing Groups in Category I.
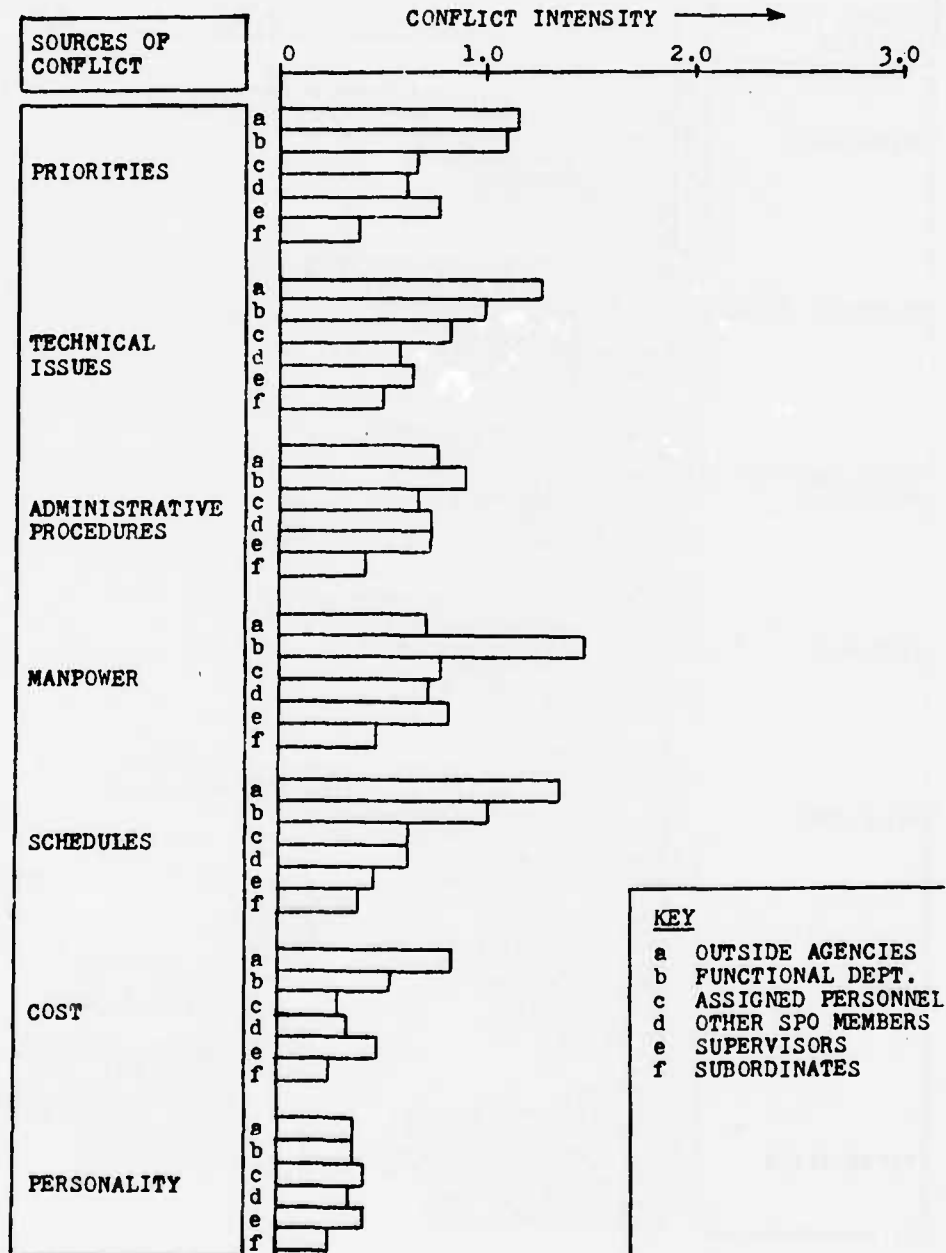
Figure 11. Conflict Intensity Profile of Interfacing Groups in Category II.
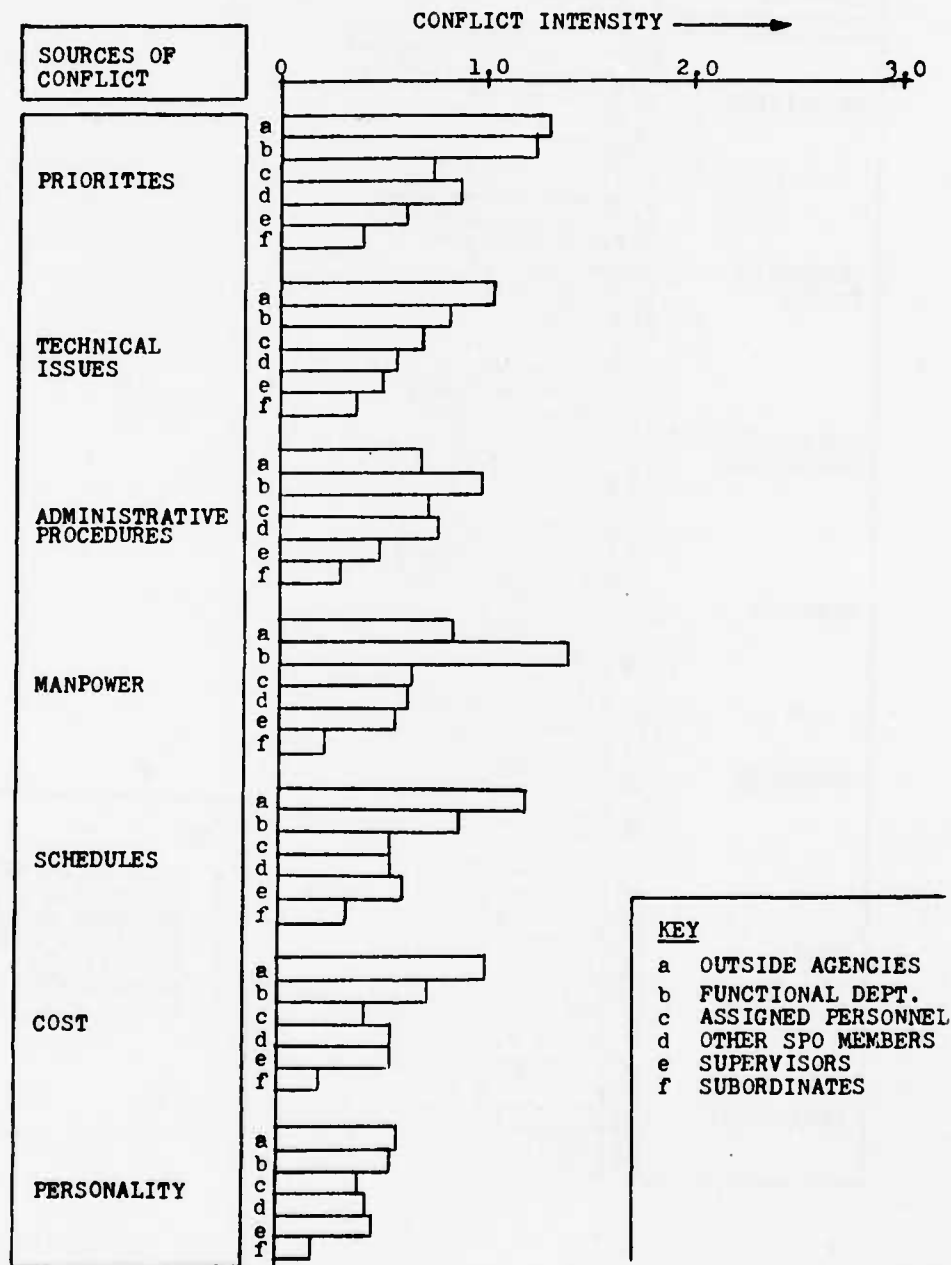
Figure 12. Conflict Intensity Profile of Interfacing Groups in Category III.

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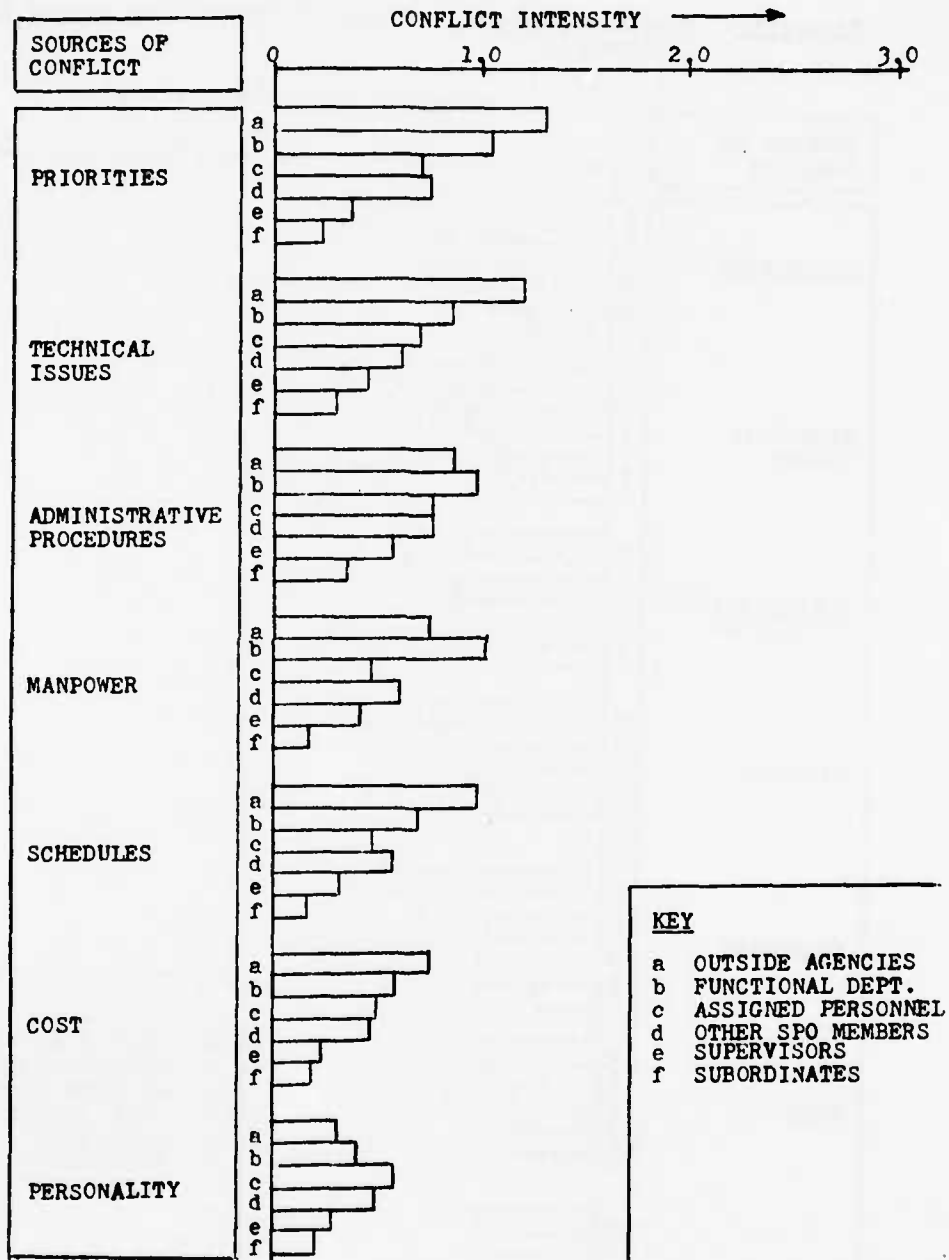
Figure 13. Conflict Intensity Profile of Interfacing Groups in Category IV.

CONFLICT INTENSITY ⟶

SOURCES OF CONFLICT

0   1.0   2.0   3.0

PRIORITIES
a
b
c
d
e
f

TECHNICAL ISSUES
a
b
c
d
e
f

ADMINISTRATIVE PROCEDURES
a
b
c
d
e
f

MANPOWER
a
b
c
d
e
f

SCHEDULES
a
b
c
d
e
f

COST
a
b
c
d
e
f

PERSONALITY
a
b
c
d
e
f

KEY
a   OUTSIDE AGENCIES
b   FUNCTIONAL DEPT.
c   ASSIGNED PERSONNEL
d   OTHER SPO MEMBERS
e   SUPERVISORS
f   SUBORDINATES

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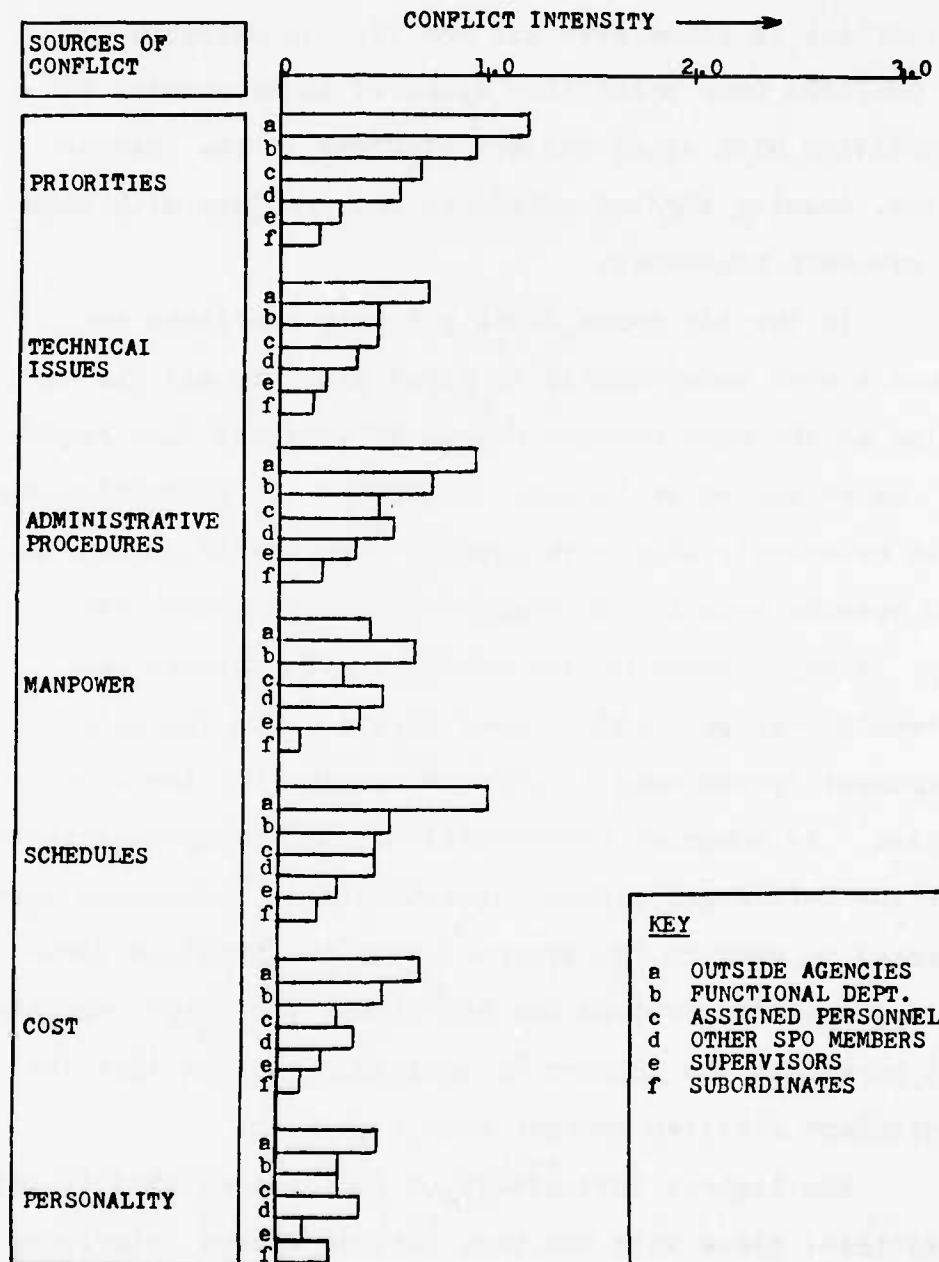
took place with support departments whose established
schedules and work patterns stood to be disturbed by the
changed requirements of supporting a project. The priori-
ties tended to decline in importance as a principal source
of conflict in Categories III and IV. In Category IV,
the conflict over priorities appeared to be related to
competition with other project startups in the organi-
zation, causing tighter schedules and problems with shar-
ing manpower resources.

In the Air Force SPOs, priority conflicts re-
mained almost consistently in first place in all the cate-
gories as the most intense source of conflict (See Figure
8). As evidenced by Figures 10 through 13, priorities were
rated relatively high with support departments as well as
with outside agencies throughout each life-cycle cate-
gory. A major cause of the conflict with support de-
partments over priorities seems to stem from the matrix
management system used to provide manning for the programs
studied. In numerous converstations, SPO managers inferred
that the better procurement specialists and engineers were
selected to work in the programs with the greatest visi-
bility, causing problems for the "lower priority" programs.
This parallels the problem of limited resources that the
counterpart civilian manager must cope with.

The highest intensities of conflict related to prior-
ities takes place with the many outside agency interfaces
(See Figures 10 through 13). Many SPO managers indicated

that a great deal of their time was spent in continuously
justifying and defending their programs to the many agen-
cies upon which the program depended on for survival.
Every military program manager lives with the fact that
his own program may not be funded, so he expends a great
deal of energy advocating the importance of the program
to gain funding support (23:177-9). From the very first
program phases, the SPO manager strives to make his pro-
gram a reality in terms of a definable and product. How-
ever, if the SPO manager spends too much time with prio-
rity issues with outside agencies, he may end up spending
too little time in prioritizing the work effort within
his program. This is turn may cause additional conflicts
with other SPO members, supervisors, and subordinates.

2. Conflict over Technical Opinions and Per-
formance Tradeoffs. Civilian managers seem to face con-
flicts in this area that are proportional to the resource
commitment trends to the program/project (See Figure 2,
page 33). The intensity of this conflict source reaches
a peak in Category III, and then decreases considerably
in Category IV (See Thamhain/Wilemon results, Figure 7,
page 77). The low conflict intensities experienced in
Category I may occur because the technical aspects are
primarily in the planning stages. As the program/project
progresses into Category II, disagreements may develop
with support departments relative to the level of support.

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Perhaps technical requrements have not been met, or per-
haps the support department may wish to maximize the tech-
nical input for which it is responsible (56:39). This
maximization may cause conflict with the cost, performance,
or schedule objectives previously set by the program/pro-
ject manager. The support departments normally do not
hold the same broad management overview of the effort
that the program/project manager does. Restraints in
cost or schedule parameters may lead to quicker or cheap-
er alternatives and disagreements may arise over the
technical alternatives. In Category III, the civilian
manager faces the problem of integrating the various pro-
ject subsystems, possibly for the first time. Conflicts
frequently develop due to a lack of proper integration,
or a poor technical performance of one or more subsystems
which directly affec: other components or subsystems.
Numerous disagreements may arise over reliability and
quality control standards, design problems, or testing pro-
cedures. Problems such as these occurring during produc-
tion can cause backlogs or even work stoppages, and intense
conflicts can be generated throughout the organization (56:
40). When the program/project reaches Category IV, most
of the technical issues have been resolved, and this con-
flict source decreases in importance.

In contrast, the SPO manager faces a great deal of
conflict over technical issues in the earlier program

life-cycle categories, which reach a peak in Category II
(See Figure 7 for SPO results). This conflict then tends
to steadily decrease in importance through Categories III
and IV. This may be partly due to the extensive "front-
end" research, development, and testing which is conducted
on new weapon systems or components prior to production
authorization. During Categories I and II, an intense
effort is made to reduce the risks and uncertainties which
may be associated with the introduction of a new system.
The users and support departments may be attempting to
maximize performance and technical aspects of the system,
while the SPO manager is trying to make tradeoffs in these
areas to stay within cost or schedule objectives. These
conflicts must be largely resolved by the time actual
production of the system begins.

3. Conflict over Administrative Procedures. Al-
though ranked high by SPO managers, this source of conflict
was rated rather low overall by civilian program/project
managers. As shown by the Thamhain/Wilemon results in
Figure 7, the conflict profile for administrative procedures
begins high in Category I and decreases dramatically as the
life-cycle progresses. Conflict in civilian organizations
occurs in this area due to disagreements over the program/
project manager's authority and responsibilities, report-
ing relationships, administrative support, status reviews
and interorganizational interfacing (56:36). For the most

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part, this area involves issues over how the program/project manager will function and how he relates to the organzation's top management. The civilian program/project manager in most cases enjoys a role as part of higher management with very little layering of management above him. Civilian program/project managers were found to normally have an average of two to five bosses, and these supervisors were normally on the vice-president levels (53:53). Most of the administrative issues are negotiated in Category I, and a detailed outline of operating procedures is developed to be followed in the conduct of the program/project. Usually a statement of understanding or a charter describing the breakout of responsibilities is signed by all participating program/project members at the very outset. This arrangement probably reduces potential conflicts in this area throughout the remaining life-cycle categories.

In contrast, the SPO manager views conflict in administrative procedures as a continuous central issue throughout the program life. This area was noted by some survey respondents are being the most disruptive in the normal day-to-day work environment. Comments relating to problems in this area focused around four main causes: the layering of management inherent in DOD organizations, the ASD matrix management system, the performance rating system, and the geographic separation from the end product.

As can be seen in Figure 7, the conflict profile of administrative procedures is exactly opposite the trend in the counterpart civilian program/project environment. Where this conflict has been reduced in the latter two categories for the civilian manager, it has become the second highest ranked conflict source for the SPO manager. The reasons for this can be seen by analyzing each of the four causes that were mentioned above.

The SPO manager has a greater number of bosses and layers of management to satisfy than his civilian counterpart. The SPO manager may interface with upwards from ten to forty different bosses or staff agencies who have the necessary authority to influence program decisions (53:56). As a result, the SPO manager is constrained by a large number of imposed directives, policies, and reporting requirements. The acquisition policies and procurement tools to carry out these requirements are established by people not directly concerned with the success of a program. Responsibilities and authority for the major policy-making and monitoring activities are diffused throughout DOD and the services at all levels. Within this framework, many can say no, but few can say yes and make it stick. In addition, the SPO manager has problems effectively exercising his delegated authority and responsibilites due to the high number of staffs and reviewing boards which must be kept fully informed (26:12). The SPO

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manager spends much of his limited time in formal report-
ing and presentations which serve no other purpose than
keeping various levels of higher headquarters informed on
his program. The civilian counterpart likewise performs
these functions, but to fewer people and in a more infor-
mal manner. With fewer layers of management and a lesser
reporting requirement, the civilian program/project manager
has a great deal more latitude over his time and the way
he approaches the decision-making process. A direct re-
sult of the numerous reporting procedures in the SPO
environment is the need for a larger staff. Due to the
"fishbowl" environment in DOD program management, the SPO
Program Directors may not think in terms of voluntary
elimination of personnel positions in Categories III and
IV (54:65). With the extensive layers of management con-
tinuously checking on the program's efficiency of opera-
tion, a large staff is needed just to handle the manda-
tory, otherwise non-productive reporting requirements.

The expanded matrix management system in ASD ap-
pears to have caused increased conflicts to arise in its
application. The use of pooled centralized resources can
cause conflicts in how these resources are distributed
among the competing needs. SPO managers took the viewpoint
that it was difficult for a required specialist to function
unless he was working for the SPO Director, rather than
for two bosses. Many SPO managers indicated that the large

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number of change orders and program peculiarities inherent
in any program makes it necessary to control program con-
trol experts, procurement specialists, and others who
have been "matrixed" within ASD. Yet this is contrary to
the theory of program management which indicates that the
military program manager's outlook was a great deal more
functionally oriented. The opposing functional depart-
ment viewpoint is that the peaks and valleys of special-
ist workloads allows the centralized matrix organization
to maintain better control and more efficient use of
the manpower resources. It also serves the purpose of
providing better training, standardization, and tracking
of the hundreds of aspects in the Armed Services Pro-
curement Regulations, which control nearly all aspects
of weapon system procurements.

Some SPO managers indicated that there remains an
absence of uniform standards by which to evaluate a SPO
manager's performance. The new Officer Effectiveness Re-
ports (OERs) may lead to optimization of short-term suc-
cesses even more so than under the older rating system.
The new system uses a quota system under which only 22%
of the officer corps is allowed an outstanding performance
report. This yearly report places a great deal of empha-
sis on comparing an officer's accomplishments with his
peer's accomplishments within the same work environment
and time frame. Long term goals and ideas such as Life-
Cycle Costing considerations, which may acutely affect a

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program's overall success, may suffer by receiving less
than their share of interest and enthusiasm. This may
be primarily due to the fact that these benefits are
gained long after the program has been deployed into
the field and the SPO manager is interested more in
receiving and outstanding performance report that is
based on the shorter term successes of the initial ac-
quisition. The point is that the SPO managers will pro-
bably have been transferred from the SPO long before the
long term problems start showing up in the field.

In contrast, a civilian program/project manager
is encouraged to look at the long term benefits which
may result in higher company gains by such actions as
follow-on contracts, or new technology breakthroughs with
a market demand. The civilian counterpart has no definite
career pattern to worry about like the SPO manager does
since his position as a program/project manager is pro-
bably just a broadening experience for him (53:67). The
civilian's assignment is based upon his previous experi-
ence and he is generally regarded as an expert. His job
security results more from the stability acquired through-
out his background and less on the basis of written per-
formance reports to determine his future work assignments.

The geographic separation of the SPO manager from
the actual end product that he is striving to manage causes
conflicts in terms of communication. The SPO managers

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indicated that they were completely dependent upon either
the Air Force or governmental contract administration
agency assigned to the contractor's facilities for hard-
ware information. They had indicated that there is a
lesser chance of face-to-face confrontation to resolve
conflict issues as most of the communication ends up
taking place over the telephone or in written correspond-
ence. The SPO managers indicated that they desired real-
time information, but if the plant contract administrator
is responsible for various aspects of many other programs
in the facility, this may not be possible.

  4. Conflict over Manpower Resources. Here is
seen another situation where the conflict profile over
the program/project life follows an almost opposite trend
from the Thamhain/Wilemon results (See Figure 7). Civilian
program/project managers noted that most conflicts associ-
ated with this source occurred with those departments which
either assign personnel to the effort or support the pro-
gram/project internally (56:36). Again, as with conflict
over technical issues, Categories I and II are used to
plan the use of manpower resources for Category III, where
the need for manpower is greatest. If the functional sup-
port departments are responsible for supporting several
programs/projects at once, severe strains over manpower
availability may develop (56:41). During Category IV,
conflict over manpower remains high possibly due to new

program/project startups, which creates competition for
personnel during the critical Category IV stages.

For SPO managers, conflict over manpower resources
is the conflict source having the highest intensity in
Category I. This may be in part due to the manpower pro-
blem that faces every newly conceived SPO. A new SPO
Director may be faced with the problem of finding quali-
fied personnel who can be released for his immediate needs
(54:51). In the beginning of most SPO formations, there
are rarely sufficient numbers of qualified personnel to
fill the validated requirements. However, once the man-
power slots are filled and the personnel system stabilizes
the turnover rate, the SPO manager may not face as many
problems of getting the support personnel that are needed
in the latter life-cycle categories. The decreasing con-
flict intensities may also be partly explained by the
fact that the SPO functional support departments are set
up in a matrix system to specifically support the SPO man-
agers. In contrast, the functional department in a civilian
organization may be permanent functional work groups, with
the program/project manager representing an infringe-
ment and a possible threat to the traditional management
system. In the Air Force, however, the matrix system is
the traditional system. Furthermore, many SPOs often suc-
cessfully establish their own "functional" sub-divisions
such as program control, engineering, etc., that are under

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the direct control of the SPO Director. As a result, con-
flict intensities would tend to be lower for SPO managers
in this area.

5. Conflict over Schedules. For the civilian pro-
gram/project manager, disagreements over schedules provides
the most intense conflicts over the total life of the pro-
gram/project. Many of these disagreements develop during
Category I over the establishment of schedules with the
support departments. The support departments may have
to accommodate newly formed projects by adjusting their
own scheduled operations, which may already be overtasked.
This adjustment process is highly susceptible to conflict
since it may involve a reorientation of present operating
patterns and local priorities (56:37). During Category
II, conflict may develop over the enforcement of the schedules
agreed upon during the negotiations in Category I (56:39).
In Category III, meeting the support-oriented schedule
commitments becomes critical to the effective overall pro-
gram/project performance. The interdependency of the vari-
ous support groups responsible for the numerous subsystems
frequently gives rise to schedule slippages. As previous-
ly discussed in the technical conflict section, problems
with integrating subsystems cause slippages in schedules
which may affect other groups if they are on the critical
path of the program/project (56:40). The conflicts with
schedules in Category IV are associated with scheduling
problems that carry over from Category III. Schedule

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slippages often become cumulative and the impact becomes most severe during the phasedown of the program/project as efforts are devoted to tying the "loose ends" together (56:41).

For the SPO manager, conflict with schedules are usually related to defining the product, reducing uncertainties in the early categories, getting the production go-ahead, and delivering the product to the user commands. Each of these areas is based on a milestone approach that closely scrutinizes the program's progress. Conflict with schedules is associated with the conflicts in priorities and administrative procedures. Slippages in schedules can mean higher production costs or possible cancellation of the program, if excessive. The highest conflict intensity for this source was noted in Category IV (See Figure 7). This probably occurs because of the preponderance of boundary spanning activities that exist with the user commands, Air Force Logistics Command, and the contractors as a new system is transitioned into the field. The schedules of the outside agencies must be carefully coordinated with the production schedule as they become more closely interdependent with respect to training and support requirements.

6. Conflict with Cost Objectives. Civilian and military program managers are faced with similar problems in this area. Disagreements over cost frequently develops

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for the civilian manager when he negotiates with other de-
partments who will perform subtasks on the program/project.
As the SPO managers, civilian program/project managers
with tight budget constraints often try to minimize costs
while support groups may want to maximize their involve-
ment of the budget (56:36). Also, conflicts may occur
because of technical problems or schedule slippages, which
tend to cause cost growth problems. In both the civilian
and military environments, cost was surprisingly not a
major determinant of conflict. It seems that most pro-
blems in this area develop gradually over time and may
provide little basis for arguments as they are occurring
(56:42).

The main difference between civilian managers
and SPO managers seems to be in the area of adjusting to
higher than predicted costs. If the costs for the civilian
program/project are higher than projected, the civilian
manager can usually provide sufficient justification of
derived company financial and non-financial benefits to
obtain the needed addition funding in short order. How-
ever, this is not the case for the SPO manager due to the
higher number of bureaucratic constraints and the greater
dollar values involved. The government procedures for
obtaining additional funds are strict and were designed
to protect public monies. The SPO manager has less flexi-
bility and authority than the civilian program/project

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manager in this area as he operates under a budget fixed by legislation. Since all of the program participants within the SPO environment may realize the restrictions placed on costs, there seem to be very few major conflicts that arise over this conflict source.

It must be stressed, however, that the conflicts over cost that do exist are important concerns for both the civilian and military manager. In both cases, cost performance is one of the key evaluation measures used in judging the performance of the manager.

7, Personality Conflict. This source of conflict was ranked low in intensity for both SPO and civilian managers. However, these conflicts tend to be the most difficult to deal with effectively. This problem was discussed as part of the Evan research finding on page 24 of this thesis. As noted, interpersonal conflicts are the most difficult to manage because they do not lend themselves as readily to rational analysis. For the civilian program/project managers, the highest intensity of personality conflict occurred in Category IV (See Thamhain/Wilemon results in Figure 7). Thamhain and Wilemon explained this increased personality conflict in Category IV in two ways:

> First, it is not uncommon for project parti-
> cipants to be tense and concerned with future
> assignments. Second, project managers fre-
> quently note that interpersonal relationships
> may be quite strained during this period due
> to the pressure on project participants to

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meet stringent schedules, budgets, and per-
formance specifications and objectives [56:
41] .

To put it another way, towards the end of the pro-
gram/project life civilian program/project participants
are worried about their future job security. If the
program/project manager is not willing to release the
participant when a job becomes available, the team member
has decreased chances of obtaining a meaningful, important
job and may even face unemployment. The civilian pro-
gram/project member has a great deal more at stake in this
area than does the SPO manager. For example, the cancella-
tion of a major weapons system program may have different
effects on the civilian and government workers involved
in the program. The government SPO program members would
probably be simply transferred to other on-going programs
and there would probably be no great concern over future
job security. On the civilian side of the problem, how-
ever, workers would most likely be laid off by the thousands
and a great deal of personal loss would be realized. All
these considerations tend to cause higher conflict in-
tensities in the civilian program/project environment (See
Figure 9).

Hyp. I Summary. To summarize, the Research Hypothesis I
results indicated support for the null hypothesis test in-
dicating that differences exist between the relative rank-
ings of the sources of conflict for civilian program/pro-
ject managers and SPO managers in each of the life-cycle

categories. The findings did not support the Research
Hypothesis that the conflict intensities within civil-
ian and military life-cycle categories were similar.
An examination of Figure 9 showed that conflict inten-
sities for every source of conflict were significantly
higher in the civilian program/project environment. Addi-
tional analysis in support of this significance can be
found in Part IV of this Chapter.

Research Hypothesis II. There is no dif-
ference in the use of conflict resolution modes
by SPO managers and civilian program/project
managers.

The conflict resolution modes were ranked by civil-
ian and SPO managers from one to five with the most appro-
priate resolution for a given situation having the rank
of one. Research Hypothesis II was analyzed using the
following null/alternate hypothesis test of Kendall Tau
between the two ratings.

Null Hypothesis, Ho: The rankings disagree.

Alternate Hypothesis, H1: The rankings agree.

The rankings of the modes of resolution for both
the civilian and SPO managers were the same:

Ranking	Mode of Resolution
1	Confrontation
2	Compromise
3	Smoothing
4	Forcing
5	Withdrawal

The result of the null/alternate hypothesis test
of a Kendall Tau value of 1.0 indicating complete agreement

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in rankings resulted in a rejection of the null hypothesis,
with a 0.0 probability of acceptance under the null hypo-
thesis.

Hyp. II Interpretation of Results. Research Hypothesis
II was supported by the rejection of the null hypothesis
test. This indicated that SPO managers and civilian pro-
gram/project managers use conflict resolution modes in
a similar manner. To obtain a graphic illustration of the
most and least important modes of conflict resolution,
the top third of the rated scores were used to identify
acceptance of the mode, and the lowest third of the scores
were used to identify rejection of a particular mode (See
Figure 14). This was the technique used by Thamhain and
Wilemon to obtain the results shown in Figure 5 on page
36. It's use here allows for a direct comparison of re-
sults.

The Thamhain/Wilemon research study disclosed an
interesting pattern in terms of the preferred conflict re-
solution modes used by the civilian managers. Over 70%
of the program/project managers in the study indicated that
confrontation was the most favored method of resolving con-
flict. This was followed by the compromising, smoothing,
forcing, and withdrawal modes (56:44). The results ob-
tained from this thesis supporting the same findings with
respect to the rank-order importance, but with a notable
difference. For every resolution mode, SPO managers con-
sistently reported a lower degree of acceptance and usage.

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THE MOST AND LEAST IMPORTANT MODES OF CONFLICT RESOLUTION

% OF AF SPO MANAGERS AND CIVILIAN PROGRAM/PROJECT MANAGERS WHOSE STYLE SEEMS TO REJECT THIS MODE.

% OF AF SPO MANAGERS AND CIVILIAN PROGRAM/PROJECT MANAGERS WHOSE STYLE SEEMS TO FAVOR THIS MODE.

CONFRONTATION

COMPROMISE

SMOOTHING

FORCING

WITHDRAWAL

AF SPO MANAGERS

CIVILIAN PROGRAM/PROJECT MANAGERS
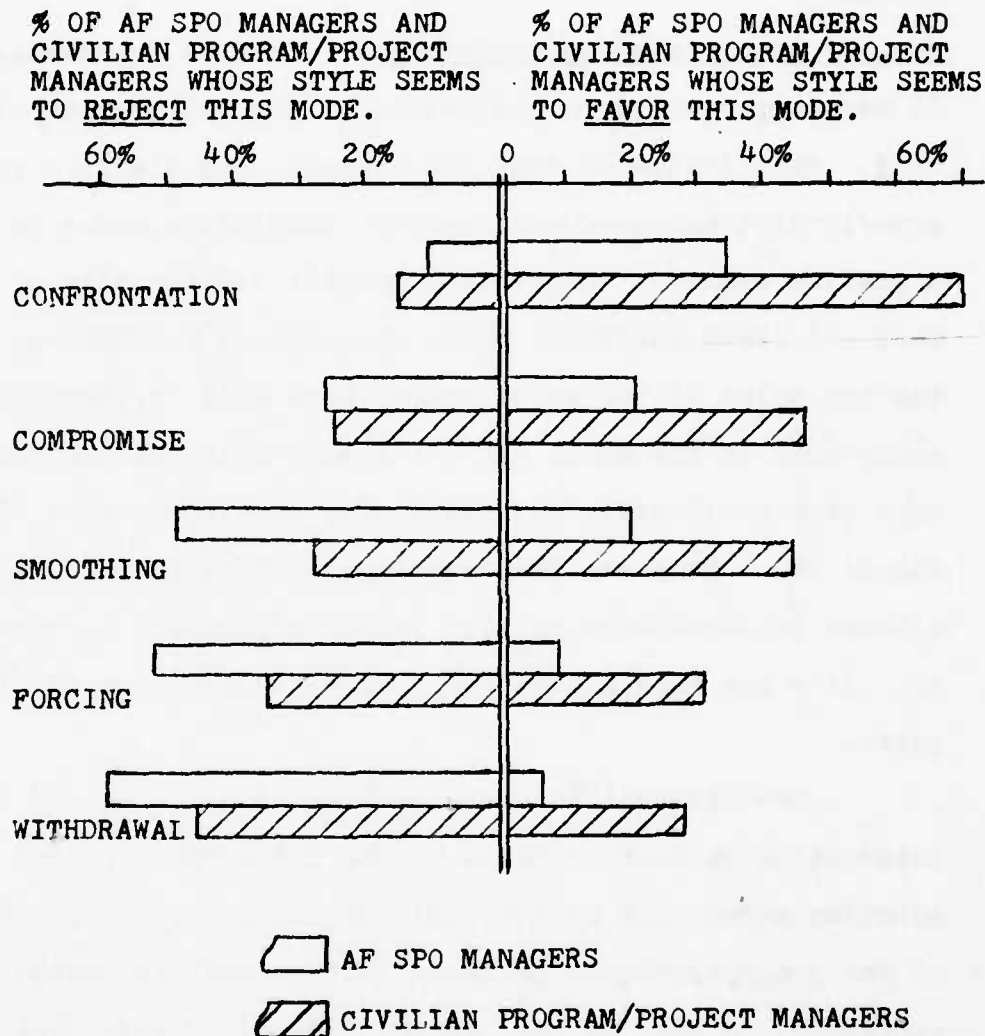
Figure 14. Comparison of Air Force and Civilian Usage of Conflict Resolution Modes.

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This may well be due to the more procedurized military
nature of the SPO environment. The larger size and the
more formal organization of many SPOs would logically lead
to a more pronounced bureaucratic tending, which in turn
may lead to clearly defined jobs; better understood author-
ity relationships; clearer lines of communications; and
more formal procedures for handling contingency problems
in terms of proliferating directives, rules, and regula-
tions. All of these factors may lead to the lower levels
of conflict noted in the Research Hypothesis I results.
This may also lead to a lesser dependence by the SPO man-
ager on the various resolution modes since a lesser degree
of conflict intensities apparently exists. However, this
lesser dependence on one's own style of conflict resolu-
tion may cause other problems, such as smothering creative
solutions and relying on formal procedures for decision-
making. Better, more effective solutions may be bypassed
as a result.

PART IV. FURTHER ANALYSIS OF DATA

To further analyze the collected data, additional
testing was performed. Examination of the sample means
of the relative intensities for each source of conflict
by interfacing groups showed that the results derived
from the Air Force sample were consistently smaller than
the corresponding means from the Thamhain and Wilemon
study (See Table 14). To support this graphical differ-
ence between means, a null/alternate hypothesis test was

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Table 14

Tests of Significance of the Mean Relative Intensities of Each of Seven Sources of Conflict

SOURCES OF CONFLICT	INTERFACING GROUPS									
	SUBORDINATES		ASSIGNED		FUNCTIONAL		SUPERIOR		MEMBERS	
	TH MEAN[1]	AF MEAN (STDEV)[2]	TH	AF	TH	AF	TH	AF	TH	AF
PRIORITIES	.9	.287 (.515)	1.7	.706 (.679)	2.4	1.006 (.739)	1.0	.507 (.655)	1.2	.721 (.605)
ADMINISTRATIVE	1.0	.309 (.524)	1.3	.532 (.708)	1.4	.912 (.765)	1.1	.529 (.666)	.9	.684 (.652)
TECHNICAL	1.1	.353 (.495)	1.4	.699 (.60)	1.7	.779 (.592)	1.0	.478 (.596)	1.3	.566 (.54)
MANPOWER	.9	.228 (.471)	1.5	.537 (.729)	2.1	1.140 (.96)	1.1	.544 (.708)	1.0	.632 (.748)
COST	.6	.162 (.389)	1.0	.360 (.540)	1.3	.610 (.701)	.8	.331 (.572)	.7	.412 (.602)
SCHEDULES	1.1	.257 (.439)	2.0	.515 (.620)	2.5	.801 (.806)	1.4	.412 (.590)	1.5	.551 (.676)
PERSONALITY	1.1	.199 (.418)	1.1	.419 (.629)	1.1	.419 (.552)	1.0	.287 (.631)	1.3	.412 (.551)

[1]Thamhain and Wilemon means were taken from Figure 9, p. 79.
[2]AF means (STDEV) or Air Force means and standard deviations were calculated from a sample of 136.

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conducted for each of the corresponding means.

The test method used was described by Winer (64:
18-24, 641). Since the standard deviation was not known
for the Thamhain and Wilemon sample means, their means
were assumed to be the universe means. The Air Force
standard deviation for the universe was estimated from the
Air Force sample. The test was conducted at the .05 signi-
ficance level using the Student t distribution. The state-
ment of proposition for the tests were as follows:

> The relative intensity for each source of
> conflict by interfacing groups, derived from
> the military, is significantly lower than the
> corresponding relative intensity derived from
> the Thamhain and Wilemon study.

For each of the corresponding means, the follow-
ing null/alternate hypotheses were tested:

Null Hypothesis, Ho: AF mean=Universe mean
(Thamhain and Wilemon
mean)

Alternate Hypothesis, H_1: AF mean<Universe
mean

The result of each test rejected the null hypo-
thesis at even the .01 significance level. The proposi-
tion was supported, indicating that there is a significant
difference between SPO managers and civilian program/pro-
ject managers relative to the mean relative intensities
of each source of conflict by interfacing groups.
Results of the Additional Testing. The relative intensi-
ties of conflict for the SPO manager was lower in every
case than for the civilian program/project manager. This

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supports the findings that the environmental differences discussed in the Research Hypothesis I section may cause the significant differences in the relative intensities of conflict faced by the military SPO managers and civilian program/project managers.

Other Notable Descriptive Statistics. Other descriptive statistics that were not directly related to the hypothesis testing used to support this thesis effort are presented in Appendices B and C.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

Summary of Results

The causes and intensities of conflict in Air Force
SPOs during the various phases of the program life-cycle
were studied using basically the same variables used in
the civilian research, which included sources of conflict,
interfacing groups, and modes of conflict resolution. The
results were compared to those of Thamhain and Wilemon's
studies of civilian program/project management efforts.
The overall findings of this effort are presented below:

1. As perceived by SPO managers, the intensities
of the conflict sources changed across the program life-
cycle as the program requirement evolved.

2. The SPO managers tended to aggregate the in-
terfacing groups into three classes based on his percep-
tion of the intensities of conflict generated by his re-
lationship of each class. The SPO manager viewed inter-
facing groups of subordinates, assigned personnel, and
other SPO members as a class of people internal to his
program organization and upon whom he could exercise direct
supervision. Superiors, functional departments and other
SPO members were viewed as a class of people external to
the SPO manager's direct control, but still within the

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parent organization of ASD. The class of people in out-
side agencies tended to be viewed as an entity by themselves.
Each of these classes were viewed as creating different in-
tensities of conflict for the SPO manager.

3. The comparison of the Air Force results with
the results obtained by Thamhain and Wilemon showed that
though conflict intensities of both studies changed over
the program life-cycle, the data did not demonstrate sim-
ilarities in what was changing and in which direction.
Further, the SPO managers perceived lesser overall con-
flict intensities than the civilian managers. Differences
in the changes across the life-cycle between the SPO and
civilian studies were attributed primarily to organization-
al and environmental differences.

4. The SPO and civilian managers rank-ordered the
appropriateness of the different modes of conflict resolu-
tion identically. However, when the data was graphically
analyzed, the SPO manager rated the actual use of each mode
to a lesser degree than did the civilian managers. This
may be due to the formalized program structure of the Air
Force organizations and the fact that SPO managers per-
ceived less overall conflict.

Conflicts within the SPO Environment

The data collected and the analysis accomplished
in this thesis indicated that there are significant dif-
ferences in the perceptions of the respondents regarding
the conflict intensities that exist across the life-cycle

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phases of the weapons system acquisition process. This supports the findings of previous studies that noted changes in behavior patterns of SPO managers in the different program categories (16, 32, 37, 49). Knowledge of when to expect the highest intensities of conflict in a program life-cycle may enable managers to better meet the managerial challenges encountered during each successive phase.

Comparison of Conflicts within the AF SPO and Civilian Program/Project Environments

Notable Differences in Conflict Intensities. The military SPO managers and civilian program/project managers accomplish basically similar jobs but in different environments, with different experiences, and under dissimilar incentives. In civilian industry, programs/projects are provided a greater opportunity to maintain personnel tenure and to minimize excessive personnel turnovers so that the people can contribute more to the jobs in which they have acquired an expertise. In contrast, the short tenure and high turnover of SPO managers leads to more management dependence upon the directives, rules, and formal procedures typical of large bureaucratic organizations. The more formalized SPO organizations and the greater dependence upon formal procedures are probably the foremost reasons for the consistent lower degrees of conflict intensities that were found in the SPO environment. As a result, the dysfunctional aspects of conflict may be stifled. At the

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same time, however, the beneficial, creative aspects of conflict that are so necessary to the effective accomplishments of program efforts may also be reduced or missing from the Air Force SPO.

A primary difference between the civilian and SPO manager is the existence of the extensive influence of the outside agencies interfacing group in the Air Force environment. The layers of management and numerous interfacing but non-program related agencies place a huge burden upon the SPO manager's limited time. The energy and time devoted to satisfying the requests of outside agencies subtracts from the time available to actually run the program. Contrasting to this, the civilian program/project manager spends the largest amount of his time on such activities as keeping the team on the same course and maintaining constant, total communications with the program/project participants and functional departments. He spends less time responding to the directives of other, marginally involved agencies and higher levels of authority. The civilian manager spends the majority of his time actively managing the program/project, team members, and the communications/coordination processes within the project. This active interaction will naturally cause higher levels of conflict intensity, as was illustrated in Figure 9. Additionally, the civilian manager has a great deal more at stake in successfully fulfilling the program/project goals. In the event of failure, it could very well mean

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unemployment for him and his team members. Conflict would
tend to be higher in such a work environment, as each team
member is likely to feel very strongly about each con-
flicting point.

Optimal Use of Conflict Resolution Modes. The results of
Research Hypothesis II indicated that SPO managers and
civilian program/project managers used conflict resolu-
tion modes in a similar manner. The most notable dif-
ference was that the SPO managers tended to place a lesser
reliance on the use of the resolution modes overall, which
was probably due to the lesser intensities of conflict
that existed within the SPO environment. As concluded
by Thamhain and Wilemon in their study, the findings of
this thesis also suggested that it is less important for
the SPO manager to optimize a best mode of conflict re-
solution, than to be able to employ the full range of
modes to deal with specific situations.

Application of the Program/Project Management Principles.
The basic, generally accepted principles associated with
the program/project management concept seem to apply to
both the civilian and military program environments. The
major differences which arise between the civilian and
military organizations stem principally from the lesser
degree of emphasis of principles within the military en-
vironment. The fact that this research effort showed such
a significant difference in conflict intensities between

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the military and civilian world doesn't negate the military applicability of previous civilian literature and research findings relating to program/project management. What is important is to know and realize how the concept is applied in both the civilian and military environment.

Therefore, the differences of conflict intensities are interpreted to result from the different applications of project management theory to meet the different environmental demands. This is supported by the finding that some human behavior characteristics displayed by both SPO managers and civilian program/ project managers remained essentially the same, as evidenced by their same basic usage of the conflict resolution modes (See Figure 14) and their same basic perceptions relating to conflict issues in program/project management as indicated in Appendix B.

Recommendations for Further Research

It is hoped that this research effort will stimulate others to further study areas relating to conflict in program management in the Air Force. In the interim, this study can provide SPO managers with evidence which can help identify where the greatest conflict is likely to exist in their own organizations. They should actively take such actions as are in their power to create conditions likely to be condusive to "manage" the conflict environment of their program.

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It is recommended that further research be conducted in the following areas:

1. To further define and analyze the effects of environmental differences, a similar investigation could be made to measure the conflict variables of this study with Air Force Logistics Command program managers for a comparison with Air Force Systems Command program managers to discover possible differences in the types of conflict they face.

2. Verification of this study's results could be accomplished by an investigation to measure and compare conflict variables of this study with the program managers of AFSC's other two product divisions of ESD and SAMSO.

3. A study into the military program management structure as it exists today and how it could be improved to reduce the dysfunctional aspects of management layering. This could include the study of previous successful efforts such as the "Blue Line" direct reporting lines described by Fox which bypass the numerous management layers to allow the program managers to report "to the top".

Concluding Remarks

In closing, the implications of this research effort can best be summed up through this direct quote from one of the participating survey respondents:

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The program manager's prime task is that of resolving conflict. Internal to his program he receives multi-discipline inputs with respect to the directed task, makes tradeoffs as required to align program goals with the weapon system's program goals, and provides a definitized program plan with specific objectives. This establishes the course of action for those working on the program; all external or internal changes must come <u>through</u> the program manager only. External to the program itself, the program manager is the program interface with the rest of the weapons system and the using and supporting commands. His primary task here is resolving conflicts with respect to priorities. The manager must be most knowledgeable of not only his program, but its impact to other agencies. The depth of knowledge in most cases must match or exceed that of the agency involved. Thus armed, he can then assist the effected agency in discovering that the program's goals are aligned with that agency's goals and priorities. This methodology produces cooperation and support that far exceed the response from an authoritarian directive.

In summary, the program manager sets specific program objectives that compliment weapons system and user priorities. He then protects his program from external perturbations by validating the contribution of program priorities to external agencies' goals.

APPENDICES

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APPENDIX A

SPO DATA COLLECTION INSTRUMENT

REPLY TO
ATTN OF: LSG (LSSR 3-77B/Captains Eschmann and Lee/AUTOVON 78-74240)

SUBJECT: Conflict in Program Management Questionnaire

TO:

1. The attached questionnaire was prepared by a research team at
the Air Force Institute of Technology, Wright-Patterson AFB, Ohio.
The purpose of the questionnaire is to gather sufficient data to
examine the causes and intensity of conflict in Air Force System
Program Offices during the various phases of the program life-cycle,
and compare these findings with a research effort that investigated
conflict in civilian program management organizations.

2. You are requested to provide an answer or comment for each
question. Headquarters USAF Survey Control Number 77-90 has been
assigned to this questionnaire. Your participation in this
research is voluntary.

3. Your responses to the questions will be held confidential.
Please remove this cover sheet before returning the completed
questionnaire. Your cooperation in providing this data will be
appreciated and will be very beneficial in evaluating a
comparison between Air Force and civilian program management
organizations. Please return the completed questionnaire in the
attached envelope within one week after receipt.

HENRY W. PARLETT, Colonel, USAF
Associate Dean for Graduate
  Education
School of Systems and Logistics

2 Atch
1. Questionnaire
2. Return Envelope

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Strength Through Knowledge

CONFLICT IN PROGRAM MANAGEMENT

QUESTIONNAIRE

PRIVACY STATEMENT

In accordance with paragraph 30, AFR 12-35, the following information is provided as required by the Privacy Act of 1974:

a. Authority:

(1) 5 U.S.C. 301, <u>Departmental Regulations</u>, and/or

(2) 10 U.S.C. 8012, <u>Secretary of the Air Force, Powers, Duties, Delegation by Compensation</u>; and/or

(3) DOD Instruction 1100.13, 17 Apr 68, <u>Surveys of Department of Defense Personnel</u>; and/or

(4) AFR 30-23, 22 Sep 76, <u>Air Force Personnel Survey Program</u>.

b. Principal purposes. The survey is being conducted to collect information to be used in research aimed at illuminating and providing inputs to the solution of problems of interest to the Air Force and/or DOD.

c. Routine Uses. The survey data will be converted to information for use in research of management related problems. Results of the research, based on the data provided, will be included in written master's theses and may also be included in published articles, reports, or texts. Distribution of the results of the research, based on the survey data, whether in written form or presented orally, will be unlimited.

d. Participation in this survey is entirely voluntary.

e. No adverse action of any kind may be taken against any individual who elects not to participate in any or all of this survey.

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CONFLICT IN PROGRAM MANAGEMENT

QUESTIONNAIRE

1. Name of Program: _____ Age of Program: ____mo.

2. Military Rank or Civilian Grade: _____

3. Age: _____years

4. Program Management Experience: _____yr. _____mo.

5. How many system programs have you worked with? ____

6. Education (circle one): HS   AA   BS   MBA   MS   DBA   Phd

7. Organizational Level. Place a checkmark in the box that
   best corresponds to the level of your duty assignment.
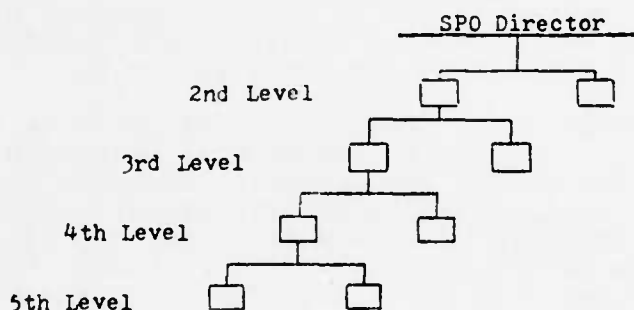
8. Consider the following two statements. After reading
   them, place a checkmark in the box that best indicates
   the extent to which your primary duties are described
   by one of the definitions or a combination of the def-
   initions.

   <u>Manager I</u> is a manager involved in dealing with other
   agencies outside of his formal authority (chain of com-
   mand). He relies a great deal on horizontal/diagonal
   relationships in an effort to monitor and control the
   cost, schedule, and performance parameters of a pro-
   gram/project. Horizontal/diagonal relationships refers
   to cutting across lines of authority on the organiza-
   tional chart.

1

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Manager II is defined as a manager involved in managing his
on-going activities in a well-defined functional area rely-
ing primarily on strict vertical chain of command relation-
ships.

Manager I								Manager II

Totally   50-50   Totally
Horizontal/   vertical
Diagonal   Relationships
Relationships
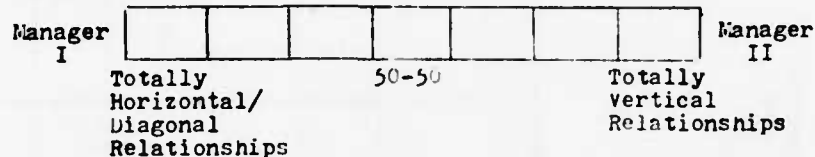
9. What percentage of your program tasks are accomplished...

   a. by yourself or subordinates directly assigned to
      your section . . . . ___%

   b. by program personnel assigned to your SPO from
      other functional groups . . . . ___%

   c. by other functional support departments over
      which you may have little or no control . . . . . ___%
                                                        _____
                                                        100%

10. From your own experience, would you agree or disagree
    with the following statements? Write a number in the
    blank for each statement, based on this scale:

    (1) Strongly disagree
    (2) Disagree
    (3) Neutral or mixed feelings
    (4) Agree
    (5) Strongly agree

___ a. The greater the diversity of expertise among the
       participants of a program, the greater the potential
       for conflict.

___ b. The lower the program manager's power of reward and
       punishment, the greater the potential for conflict to
       develop.

___ c. The less the specific objectives of a program are
       understood by the members, the more likely that con-
       flict will develop.

___ d. The greater the ambiguity of roles among program
       participants, the more likely conflict will develop.

___ e. The greater the agreement on top management goals,
       the lower the potential for detrimental conflict on
       the program level.

___ f. The lower the program manager's formal authority
       over supporting organizational units, the more likely
       conflict will occur.

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11. What are the major Causes of Conflict in your work environment? Indicate the relative magnitude by a checkmark in the columns provided. Definitions of the terms used are provided on the following pages. The numbers in each column represent the intensity of conflict as follows.

(1) No conflict
(2) Some conflict
(3) Considerable conflict
(4) Great conflict

	With Your Subordinates (1)(2)(3)(4)	With Assigned Program Personnel (1)(2)(3)(4)	With Functional Departments (1)(2)(3)(4)	With Your Superior (1)(2)(3)(4)	With Other SPO Members (1)(2)(3)(4)	With Outside Agencies (1)(2)(3)(4)
Conflict over Program Priorities						
Conflict over Administrative Procedures						
Conflict over Technical Opinions and Performance Tradeoffs						
Conflict over Manpower Resources						
Conflict over Cost Objectives						
Conflict over Schedules						
Personality Conflict						

Definitions for Question #11

(A) VERTICAL AXIS - 7 POTENTIAL CONFLICT SOURCES

CONFLICT OVER PROGRAM PRIORITIES. The views of program participants often differ over the sequence of activities and tasks which should be undertaken to achieve successful program completion. Conflict over priorities may occur not only between the SPO and other support groups, but also within the SPO itself.

CONFLICT OVER ADMINISTRATIVE PROCEDURES. A number of managerial and administrative-oriented conflicts may develop over how the program will be managed; i.e., the definition of the program manager's reporting relationships, operational requirement, scope, definition of responsibilities, interface relationships, negotiated work agreements with other groups, and procedures for administrative support.

CONFLICT OVER TECHNICAL OPINIONS AND PERFORMANCE TRADEOFFS. Disagreements may arise over technical issues, performance specifications, technical tradeoffs, and the means to achieve technical performance.

CONFLICT OVER MANPOWER RESOURCES. Conflicts may arise around the staffing of the program with personnel from other functional and staff support areas or from the desire to use another department's personnel for program support even though the personnel remain under the authority of their functional superiors.

CONFLICT OVER COST. Conflict may develop over cost estimates from support areas regarding various program work breakdown packages.

CONFLICT OVER SCHEDULES. Disagreements may develop around the timing, sequencing, and scheduling of project related tasks.

PERSONALITY CONFLICT. Disagreements may tend to center on interpersonal differences rather than on "technical issues". Conflicts are often "ego-centered".

(B) HORIZONTAL AXIS - 6 INTERFACING GROUPS WHERE CONFLICT MAY OCCUR

SUBORDINATES. Personnel that are directly assigned to the program and working under the supervision of the program manager.

ASSIGNED PROGRAM PERSONNEL. Personnel from the functional departments who are temporarily assigned to the program on a "loaned" basis.

FUNCTIONAL DEPARTMENTS. In an organization these are the specialized departments from which the program manager must obtain support for his program, i.e., the engineering office and the procurement office.

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SUPERIORS. This refers to the personnel to whom the program manager is immediately responsible.

OTHER SPO MEMBERS. These personnel are the other team members assigned to a SPO. In a Super-SPO, this may refer to the various subsystem program managers who must work together to deliver a final product. In the smaller SPO's, this may refer to other program managers on the same organizational level upon which a program manager may have to depend on for his own program's objectives.

OUTSIDE AGENCIES. This includes outside influences such as AFSC Headquarters, user commands, Inspector General teams, and the host or outside Air Force agencies that continually interface with ASD program managers.

12. Indicate the current system acquisition phase for your Program. If aspects of your program cover several phases, indicate below the phase in which the majority of the tasks fall.

Conceptual ☐ Validation ☐ Full-Scale Development ☐

Production ☐ Deployment ☐

13. Relating to your own experience, where in time would you say most of the conflict occurs over the program life? Please indicate by checking the appropriate column for each conflict category (only one checkmark per row).

Conflict over...	Concep-tual	Valid-ation	Full-Scale Dev.	Produc-tion	Deploy-ment	Equal in all Periods
Program Priorities						
Administra-tive Proce-dures						
Technical Issues						
Manpower Resources						
Cost Objec-tives						
Schedules						
Personality						

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14. The list of 15 proverbs represents folk wisdom about methods of handling conflict. Use the following scores in evaluating the accuracy at which each proverb describes the actual way you resolve conflict.

(1) Very accurate in most situations
(2) Accurate in some situations
(3) Accurate only in very few situations
(4) Not accurate at all

	How Accurately Does the Proverb Describe the Way You Resolve Conflict Between You and...		
	...Your Program Personnel?	...Your Superior?	...Functional Sup-Depart.?
Better half a loaf than no bread			
Might overcomes right			
Come now and let us reason together	,		
The arguments of the stronger always have the most weight			
When two quarrel he who keeps silent first is the most praiseworthy			
If you cannot make a man think as you do, make him do as you think			
When one hits you with a stone, hit him with a piece of cotton			
By digging and digging, the truth is discovered			
Kill your enemies with kindness			
You scratch my back, I'll scratch yours			
He who runs away lives to run another day			
It is easier to refrain than to retreat from a quarrel			
Soft words win hard hearts			
Don't stir up a hornet's nest			
A man who will not flee will make his foe flee			

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APPENDIX B

PERCEPTIONS OF SPO MANAGERS TOWARDS
CONFLICT DETERMINANTS

APPENDIX B

PERCEPTIONS OF SPO MANAGERS TOWARDS CONFLICT DETERMINANTS

Thamhain and Wilemon empirically tested seven propositions as listed below on specific determinants of project management conflict (57:40).

Proposition 1: The less the specific objectives of a project are understood by project team members the more likely that conflict will develop.

Proposition 2: The more members of a functional area perceive that the implementation of project management will adversely affect their traditional organizational roles, the greater the potential for conflict.

Proposition 3: The greater the ambiguity of roles among participants of a project team the more likely that conflict will develop.

Proposition 4: The greater the agreement on top management goals, the lower the potential for detrimental conflict at project level.

Proposition 5: The lower the project manager's formal authority over supporting organizational units, the more likely conflict will occur.

Proposition 6: The lower the project manager's power of reward and punishment, the greater the potential for conflict to develop.

Proposition 7: The greater the diversity of expertise among the participants of a project team, the greater the potential for conflict.

The results of the study were "specifically, project managers perceive that the intensity of conflict is likely to increase with (1) decreasing understanding among project managers, (2) improper understanding of project mission,

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organization, and roles of team members, and (3) decreasing formal authority, reward and punishment power over supporting units [57:35]". Propositions 1 through 6 were supported and not 7.

To compare the Air Force SPO managers and civilian project managers, SPO managers were tested using six of the seven propositions. Proposition 2 was not used because program management is already considered as an established organization in the Air Force. The only change to the six propositions used was the changing of the word "project" to "program" to correspond with Air Force terminology.

The research design and methodology, the same as that of Thamhain and Wilemon, consisted of the Kolmogorov-Smirnov (KS) and Binomial Test at the .01 significance level (57:35-36). The Air Force data was obtained from the survey instrument, question 10 (See Appendix A).

The results of the tests were the same as that of Thamhain and Wilemon except for Proposition 6, which was not supported. This may be due to the fact that since the matrix in Air Force Program Management Organization is specifically set up to provide support to the SPO managers, their performance reports depend highly upon their effectiveness in supporting a program, regardless whether the SPO manager writes the actual report or not. In civilian programs/projects, the situation may be different whereby the program/project manager may not be able

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to influence any performance reporting of the functional support personnel temporarily assigned to him. This may cause conflicts to develop since the assigned personnel will tend to favor all actions desirable from the functional department viewpoints.

The comparison between Air Force SPO managers and civilian project managers are shown in Figure 15. The overall results tended to indicate the Air Force SPO managers perceived specific determinants of project management conflict similar to civilian project managers.

Figure 15. Distribution of Opinions Concerning Conflict in
Program Management

KEY: o——o AF SPO MANAGERS
x----x CIVILIAN MANAGER

KEY: (1)STRONGLY
         DISAGREE
      (2)DISAGREE
      (3)NEUTRAL
      (4)AGREE
      (5)STRONGLY
         AGREE

PROPOSITION 1

PROPOSITION 3

PROPOSITION 4

PROPOSITION 5

PROPOSITION 6*

PROPOSITION 7*

←——STRENGTH OF   STRENGTH ——→
    DISAGREEMENT   OF AGREEMENT INCREASES
    DECREASES
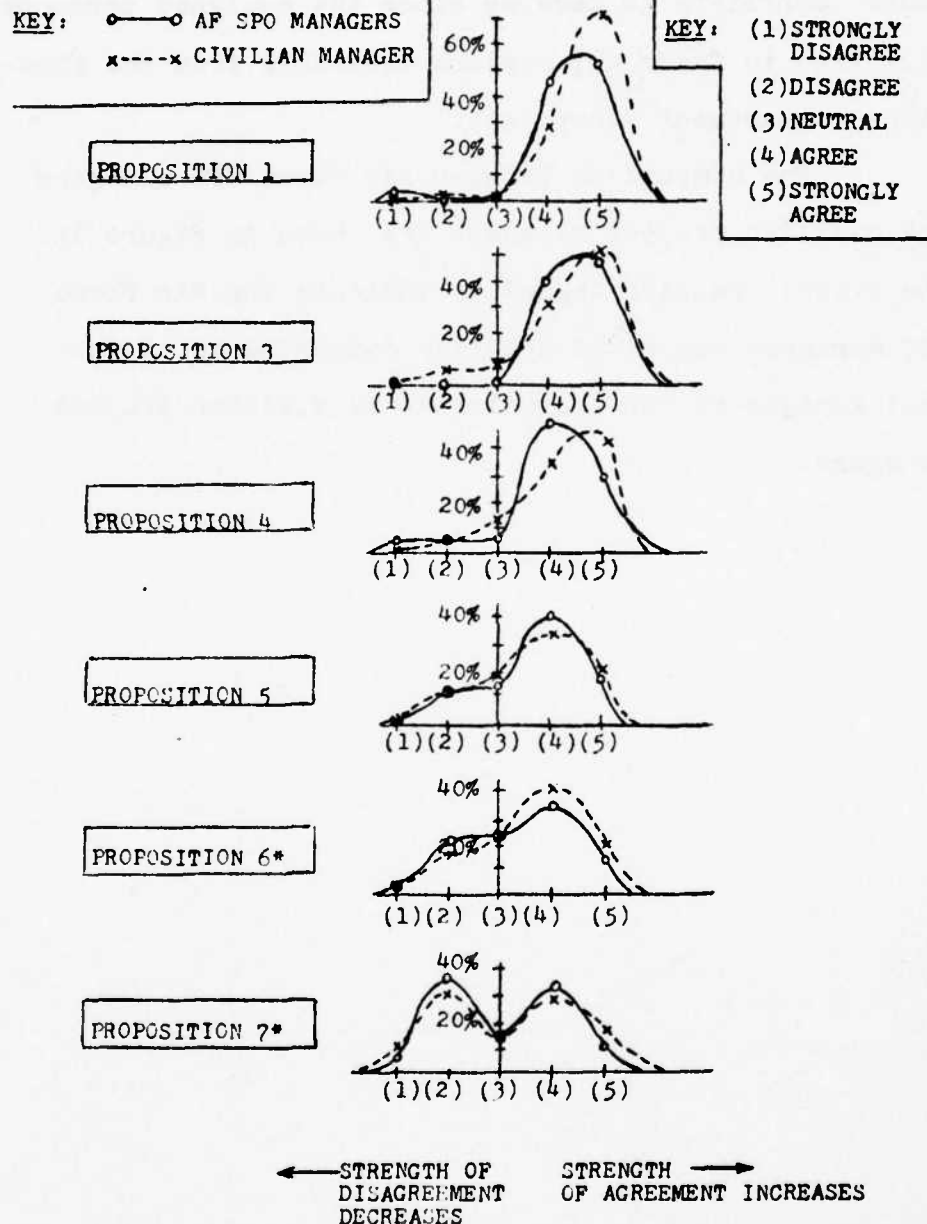
*KS test resulted in rejection of the null hypothesis, but
the Binomical test could not reject.

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APPENDIX C

OTHER DESCRIPTIVE STATISTICS

APPENDIX C

OTHER DESCRIPTIVE STATISTICS

Descriptive statistics were extracted from the data and are presented in the tables of this Appendix. A description of them follows. See Appendix A for the referenced questions.

Table 15 provided the number of respondents by their System Program Office in ASD. The data was tabulated from question 1 in the questionnaire.

Table 16 provided the number of respondents by military rank/civil service grade. The data was tabulated from question 2 in the questionnaire.

Table 17 provided the number of respondents by their position in the organization, i.e., organizational level. The data was tabulated from question 7 in the questionnaire.

Table 18 provided the number of respondents by education over the program life-cycle. The data was tabulated from question 6 in the questionnaire.

Table 19 provided the number of respondents by program life-cycle. The data was tabulated from question 4 in the questionnaire.

Table 20 provided the number of respondents by percentage of work performed by three groups: (1) SPO

manager and his subordinates, (2) assigned (collocated) functional personnel and (3) other functional departments. The data was tabulated from question 9 of the question-naire.

Table 15

Number of Respondents by System Program Office

CODE FOR RAW DATA	SYSTEM PROGRAM OFFICE	FREQUENCY	RELATIVE FREQUENCY
113	F-16 SPO	4	2.9
114	A-10 SPO	6	4.4
115	B-1 SPO	6	4.4
122	F-15 SPO	5	3.7
201	INTERNATIONAL FIGHTER (F-5E/F)	18	13.2
202	EF-111A TACTICAL JAMMING	4	2.9
203	SIMULATORS	7	5.1
204	AIRLIFT SYSTEMS	9	6.6
205	AGM-65 MAVERICK	4	2.9
206	FIGHTER ATTACK	12	8.8
207	ADVANCED MEDIUM STRATEGIC TRANSPORT (AMST)	3	2.2
208	PRECISION LOCATION STRIKE SYSTEMS	6	4.4
209	ADVANCED STRATEGIC AIR LAUNCHED MISSILE	3	2.2
210	REMOTELY PILOTED VEHICLES (RPV)	13	9.6
212	AGM-69 SRAM	4	2.9
223	DEVELOPMENTAL PLANS	6	4.4
316	RECCE/STRIKE	14	10.3
317	AVIONICS STANDARDIZATION & SYSTEMS ARCHITECTURE	4	2.9
319	ELECTRONIC WARFARE	4	2.9
321	SUPPORT EQUIPMENT	4	2.9
	TOTAL	136	100.0

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Table 16

Number of Respondents by Rank/Grade

MILITARY RANK/CIVIL SERVICE GRADE	FREQUENCY	RELATIVE FREQUENCY %
LIEUTENANT	1	.7%
GS-9	3	2.2
CAPTAIN	41	30.1
GS-12 OR ABOVE	30	22.1
MAJOR	46	33.8
LIEUTENANT COLONEL	14	10.3
NO ANSWER	1	.7
TOTAL	136	100.0%

Table 17

Number of Respondents by Their Position in the Organization, i.e., Organizational Level

ORGANIZATIONAL LEVEL	FREQUENCY	RELATIVE FREQUENCY
1 (SPO DIRECTOR)	2	1.5%
2	26	19.1
3	76	55.9
4	28	20.6
5	4	2.9
TOTAL	136	100.0%

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Table 18

Number of Respondents by Education Over the Program Life-Cycle

CATEGORY*	EDUCATIONAL LEVEL	FREQUENCY	RELATIVE FREQUENCY %
I	BS MBA MS DBA PHD	10 3 15 1 1	33.3% 10.0 50.0 3.3 3.3
	SUBTOTAL	30	100.0
II	HS BS MBA MS PHD OTHER	1 6 12 19 3 1	2.4 4.3 28.6 45.2 7.1 2.4
	SUBTOTAL	42	100.0
III	HS BS MBA MS PHD	1 7 2 21 1	3.1 21.9 6.3 65.6 3.1
	SUBTOTAL	32	100.0
IV	HS BS MBA MS NO ANS	1 8 6 15 2	3.1 25.0 18.8 46.9 6.3
	SUBTOTAL	32	100.0
	TOTAL	136	400%

*Categories refer to program life-cycle phases/stages, described on page 44.

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Table 19

Number of Respondents by Program Experience and Program Life-Cycle Category

CATEGORY *	PROGRAM EXPERIENCE	FREQUENCY	RELATIVE FREQUENCY
I	0 < MONTHS ≤ 18 18 < MONTHS ≤ 48 48 < MONTHS	6 21 13	20% 36.7 43.3
	SUBTOTAL	30	100%
II	0 < MONTHS ≤ 18 18 < MONTHS ≤ 48 48 < MONTHS	7 20 15	16.7 47.5 35.8
	SUBTOTAL	42	100%
III	0 < MONTHS ≤ 18 18 < MONTHS ≤ 48 48 < MONTHS	4 20 18	12.5 31.3 56.2
	SUBTOTAL	32	100%
IV	0 < MONTHS ≤ 18 18 < MONTHS ≤ 48 48 < MONTHS	6 20 16	18.7 31.3 50.0
	SUBTOTAL	32	100%
	TOTAL	136	400%

*Categories refer to program life-cycle phases/stages described on page 44.

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Table 20

Number of Respondents by Percentage of Work Performed by Three Groups

PERCENTAGE OF WORK	GROUPS					
	WORK PERFORMED BY SPO MANAGER & HIS SUBORDINATES		WORK PERFORMED BY ASSIGNED FUNCTIONAL PERSONNEL		WORK PERFORMED BY OTHER FUNCTIONAL DEPARTMENTS	
	FREQUENCY	RELATIVE FREQUENCY	FREQUENCY	RELATIVE FREQUENCY	FREQUENCY	RELATIVE FREQUENCY
$0 < \% \leq 10$	5	3.7%	23	16.9%	63	46.3%
$10 < \% \leq 20$	10	7.4	23	16.9	26	19.1
$20 < \% \leq 30$	11	8.1	28	20.6	11	8.1
$30 < \% \leq 40$	15	11.0	25	18.4	7	5.1
$40 < \% \leq 50$	32	23.5	20	14.7	10	7.4
$50 < \% \leq 60$	17	12.5	4	2.9	1	.7
$60 < \% \leq 70$	13	9.6	2	1.5	2	1.5
$70 < \% \leq 80$	18	13.2	2	1.5	3	2.2
80 and above	12	8.8	2	1.5	0	0.0
NO ANSWER	3	2.2	7	5.1	13	9.6
TOTAL	136	100%	136	100%	136	100%

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APPENDIX D

RAW DATA AND COMPUTER PROGRAMS

APPENDIX D

RAW DATA AND COMPUTER PROGRAMS

PART I. RAW DATA

The raw data from each questionnaire was coded
in a sequence of numbers represented by two lines. The
questionnaires were grouped by life-cycle categories.
The key for the coding is presented first on the follow-
ing pages before the raw data.

KEY FOR RAW DATA

VARIABLE/LABEL	POSITION OF VARIABLE VALUE	QUESTION REFERRED TO IN QUESTIONNAIRE	CODE: VARIABLE VALUES= DESCRIPTION*
	LINE #1		
Q1 PROGRAM NAME	1-3	1	SEE TABLE 15.
Q2 PROGRAM AGE	4-5	1	XX=AGE IN MONTHS.
Q3 RANK/GRADE	6	2	1=LIEUTENANT,2=CAPTAIN,3=MAJOR 4=LIEUTENANT COLONEL,5=COLONEL 6=GS-7,7=GS-9,8=GS-11,9=GS-12 AND ABOVE.
Q4 INDIVIDUAL'S AGE	7-8	3	XX=AGE IN YEARS.
Q5 EXPERIENCE	9	4	$1=0<MONTHS\leq6, 2=6<MONTHS\leq12$ $3=12<MONTHS\leq18, 4=18<MONTHS\leq24$ $5=24<MONTHS\leq30, 6=30<MONTHS\leq36$ $7=3<YEARS\leq4, 8=4<YEARS\leq5, 9=5$ YEARS.
Q6 NUMBER OF PROGRAM	10	5	1=1 PROGRAM,2=2,3=3...8=8 9=9 AND ABOVE.
Q7 EDUCATION	11	6	1=HS,2=AA,3=BS,4=MBA,5=MS 6=DBA,7=PHD,8=OTHER.
Q8 ORGANIZATIONAL LEVEL	12	7	1=SPO DIRECTOR,2=2ND LEVEL 3=3RD LEVEL,4=4TH LEVEL, 5=5TH LEVEL.

*UNLESS OTHERWISE SPECIFIED 0=MISSING VALUE

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VARIABLE/LABEL	VARIABLE VALUE	QUESTION IN QUESTIONNAIRE	CODE: VARIABLE VALUES= DESCRIPTION
Q9 PROJECT VS FUNCTIONAL	13	8	1=TOTALLY HORIZONTAL-DIAGONAL RELATIONSHIPS 2= 3= 4=50-50 5= 6= 7=TOTALLY VERTICAL RELATION-SHIPS.
Q10 PERCENT TASK	14	9a	1=0≤%≤10,2=10<%≤20,3=20<%≤30 4=30<%≤40,5=40<%≤50,6=50<%≤60 7=60<%≤70,8=70<%≤80,9=80 AND ABOVE.
Q11 ASSIGNED PERSONNEL	15	9b	SAME AS ABOVE.
Q12 FUNCTIONAL DEPART-MENTS	16	9c	"
Q13 DIVERSITY OF EXPERTISE	17	10a	1=STRONGLY DISAGREE,2=DISAGREE 3=NEUTRAL,4=AGREE,5=STRONGLY AGREE.
Q14 LOWER PM POWER	18	10b	"
Q15 SPECIFIC OBJECTIVES	19	10c	"
Q16 ROLE AUTHORITY	20	10d	"
Q17 GOAL AGREEMENT	21	10e	"
Q18 FORMAL AUTHORITY	22	10f	"

VARIABLE/LABEL	VARIABLE VALUE	QUESTION IN QUESTIONNAIRE	CODE: VARIABLE VALUES- DESCRIPTION
Q19 DATA?	23	14	1=MODES OF RESOLUTION DATA USEABLE,2=MODES OF RESOLUTION DATA NOT USEABLE.
FORCING			
Q20 PROGRAM PERSONNEL	24	14	0=NOT ACCURATE AT ALL. 1= ↕ 2= ↕ 3=ACCURATE ONLY IN VERY FEW SITUATIONS
Q21 SUPERIOR	25	14	
Q22 FUNCTIONAL	26	14	4= ↕ 5= ↕ 6=ACCURATE IN SOME SITUATIONS. 7= ↕ 8= ↕ 9=VERY ACCURATE IN MOST SITUATIONS.
SMOOTHING			
Q23 PROGRAM PERSONNEL	27	14	SAME AS ABOVE.
Q24 SUPERIOR	28	14	"
Q25 FUNCTIONAL	29	14	"
CONFRONTATION			
Q26 PROGRAM PERSONNEL	30	14	"
Q27 SUPERIOR	31	14	"
Q28 FUNCTIONAL	32	14	"

VARIABLE/LABEL	VARIABLE VALUE	QUESTION IN QUESTIONNAIRE	CODE: VARIABLE VALUES= DESCRIPTION
WITHDRAWAL			
Q29 PROGRAM PERSONNEL	33	14	:
Q30 SUPERIOR	34	14	:
Q31 FUNCTIONAL	35	14	:
COMPROMISE			
Q32 PROGRAM PERSONNEL	36	14	:
Q33 SUPERIOR	37	14	:
Q34 FUNCTIONAL	38	14	:
Q35 PRIORITIES	39	13	1=CONCEPTUAL,2=VALIDATION
Q36 ADMINISTRATIVE	40	13	3=FULL SCALE DEVELOPMENT 4=PRODUCTION,5=DEPLOYMENT
Q37 TECHNICAL	41	13	6=ALMOST EQUAL IN ALL PERIODS.
Q38 MANPOWER	42	13	SAME AS ABOVE.
Q39 COST	43	13	:
Q40 SCHEDULE	44	13	:
Q41 PERSONALITY	45	13	:

LINE #2

| Q42 PHASE? | 1 | 12 | 1=CONCEPTUAL=VALIDATION 2=FULL SCALE DEVELOPMENT 3=PRODUCTION,4=DEPLOYMENT. |

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VARIABLE/LABEL	VARIABLE VALUE	QUESTION IN QUESTIONNAIRE	CODE: VARIABLE VALUES= DESCRIPTION
Q43 DATA?	2	11	1=CONFLICT DATA USEABLE 2=CONFLICT DATA NOT USEABLE.
PRIORITIES			
Q44 SUBORDINATES	3	11	0=NO CONFLICT,1=SOME CONFLICT
Q45 ASSIGNED	4	11	2=CONSIDERABLE CONFLICT 3=GREAT CONFLICT.
Q46 FUNCTIONAL	5	11	SAME AS ABOVE.
Q47 SUPERIOR	6	11	"
Q48 OTHER SPO	7	11	"
Q49 OUTSIDE AGENCIES	8	11	"
ADMINISTRATIVE			
Q50 SUBORDINATES	9	11	"
Q51 ASSIGNED	10	11	"
Q52 FUNCTIONAL	11	11	"
Q53 SUPERIOR	12	11	"
Q54 OTHER SPO	13	11	"
Q55 OUTSIDE AGENCIES	14	11	"
TECHNICAL			
Q56 SUBORDINATES	15	11	"
Q57 ASSIGNED	16	11	"

VARIABLE/LABEL	VARIABLE VALUE	QUESTION IN QUESTIONNAIRE	CODE: VARIABLE VALUES-DESCRIPTION
Q58 FUNCTIONAL	17	11	: : :
Q59 SUPERIOR	18	11	: : :
Q60 OTHER SPO	19	11	: : :
Q61 OUTSIDE AGENCIES	20	11	: : :
MANPOWER			
Q62 SUBORDINATES	21	11	: : :
Q63 ASSIGNED	22	11	: : :
Q64 FUNCTIONAL	23	11	: : :
Q65 SUPERIOR	24	11	: : :
Q66 OTHER SPO	25	11	: : :
Q67 OUTSIDE AGENCIES	26	11	: : :
COST			
Q68 SUBORDINATES	27	11	: : :
Q69 ASSIGNED	28	11	: : :
Q70 FUNCTIONAL	29	11	: : :
Q71 SUPERIOR	30	11	: : :
Q72 OTHER SPO	31	11	: : :
Q73 OUTSIDE AGENCIES	32	11	: : :

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VARIABLE/LABEL	VARIABLE VALUE	QUESTION IN QUESTIONNAIRE	CODE: VARIABLE VALUE= DESCRIPTION
SCHEDULES			
Q74 SUBORDINATES	33	11	: : :
Q75 ASSIGNED	34	11	: : :
Q76 FUNCTIONAL	35	11	: : :
Q77 SUPERIOR	36	11	: : :
Q78 OTHER SPO	37	11	: : :
Q79 OUTSIDE AGENCIES	38	11	: : :
PERSONALITY			
Q80 SUBORDINATES	39	11	: : :
Q81 ASSIGNED	40	11	: : :
Q82 FUNCTIONAL	41	11	: : :
Q83 SUPERIOR	42	11	: : :
Q84 OTHER SPO	43	11	: : :
Q85 OUTSIDE AGENCIES	44	11	: : :

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```
0010  3161295099434613445554132285895577734823316223
0011  1101210110111111210200111200120111211311010100
0020  2041743972531442344554144444488844433316233346
0022  1112211112212111111211111110112111111111112111
0030  2084823442354821234541136532465423177525222 25
0033  1111011001111011111112132121121131221130 00100
0040  2070033641332721224343145422266611133366 33336
0044  1111211211111121122121121120011021122121 1111
0050  2076023521534541234444144455577333666000 0000
0055  1111101101101000100100000011001000000000 000
0060  2093423250333514255544101143465512343512 06336
0066  1100010200010100000100001000000001000000 000
0070  2030023032532622325542112133366655544442 34123
0077  1100000111111211000223323200000100000111 1011
0080  3191222825334641425544133344366611143412 23336
0088  1111100111000011211012001000000001110010 00000
0090  2030733633532721344443110122222200020200 00000
0099  1101100000101001111201200000000000110110 00000
0100  2102123641533911254445101003212133302266 23666
0101  1100000000011111121000000011120110000000 0000
0110  3164533591532550225532122277777744466616 11166
0111  1100000011100000000000000000000000000000 0000
0120  2122430092332811245455100077744333666666 66666
0122  1100311111211100010100300010011111201100 000C
0130  2230694061323444334444166699977777866611 11111
0133  1111121111111011111111221111111111211111 1110
0140  2232995796324604445444166688877777766626 06446
0144  1111111111101011201011211100000000000000 0000
0150  2090044377514533244443155588899933354566 66666
0155  1111111200000111111111011021011011100100 1000
0160  2230094170732911245554123265696945511332 611246
0166  1101211111211000101001311001221111321200 1010
0170  2043095795321442513455145487866645444513 34231
0177  1101200100100111101100110000000000000000 00001
0180  3167294897322911224542112265588733301036 33336
0188  1100111100000011111101111001110100100000 0000
0190  2093494196441235215452101123266711122533 16362
0199  1100211300010300201300200100102200202100 0001
0200  2230994295533712255532144444443332044313 22341
0201  1101121100011111100101222200000012203300 0011
0210  3165644199523721324545163422222222255834 23236
0211  1101112112110011112011100111111112111111 111
0220  2230044152522812431454173824328537866666 16446
0222  1111211201211101111211212011111101112200 1000
0230  2239623400524551434443113287776655566600 00000
0233  1101011000000000010000100000000000001000 000
0240  2106023095536812234444138844476646585633 23336
0244  1100311100110003010001301000000000100003 0200
0250  2084833999433622224432120200042200000066 66666
0255  1100100101111111111110010110000010000010 00002
```

```
0260  2106033695621442235522112165666633354526362<br>66
0266  11111111111111112111212312000000101201211111<br>1
0270  32103337235303621245422000000000000000001622446
0277  11000001010010000002001001000002000002010010
0280  20848338315315412255532000000000000000000000
0288  11122313122313001002232310012111121211111311
0290  31648231523338212455552000000000000002226226
0299  11000001001001000001001002000000000002000000
0300  20765338925324512324531333222666111334233226
0301  11001011000001111101000100000000000101000000
```

RAW DATA: CATEGORY II

```
0010  31712234935348113455542000000000000000002633666
0011  21111111122211000000012311000202111111001111
0020  21072929952319003354542000000000000000000000
0022  21001000000000010000010000010000010000010000
0030  21024334427325334455442000000000000000003323336
0033  21002011001010011011001100001001001001002000
0040  31635339758225324544442000000000000000003426346
0044  21111011011011011011111111112011011011110010
0050  21036231635329112454542000000000000000003623336
0055  21012011011011011011002021001011002011001000
0060  31712336314327312244531565988777434868666030 06
0066  21012002021020001001012011001111022112001001
0070  20400962999335502344431343666777666878000000 0
0077  21011111000110111111000000001110011211000200
0080  20334725613432173445451200000311200100363333 6
0088  21011011010101011001010101010001010101010001
0090  20350234414422724224441222666888333545123612 6
0099  21002000010110010000131000000000001000001011
0100  20333943994333354555451142213544022445633323 6
0101  21112111113101112112112210102102112112112111
0110  20333231445321272155521323636535111223661434 6
0111  21012210011110001100002221001110002211100000 0
0120  20499953913368212445141423798555553325463443 6
0122  21001011011011010111010000011011111111000000
0130  21070440933226324555451334665768444446303613 6
0133  21012122112121111211112312201201211211200101 1
0140  21072440934325413355541222666999666333262622 6
0144  21111011111111111111011111100111100000111111 2
0150  21000234735335821435555100044477722243423333 66
0155  21001011001011111001001011000000001011000000
0160  21072223442434550245552133311133300022433234 33
0166  21001101000000020000002000000000000000000000
0170  31924338434332184555541193212535121646322344 6
0177  21012110001210001001013112011102002103011200
0180  31636341954325322355441668201434010004633334 6
0188  21011011012001011012013011002001103002000000
0190  31648336725329111344431012333888333211333333 6
0199  21000001000001001001012011000001000001000000
0200  31712333731322551445544144433366633366633263 36
```

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```
0201  21111111000000111011000001111111111111000000
0210  31726233425324424544551373333646434545453623336
0211  21101002000000100000001000000000001103000003
0220  20313342995320904455441888442878445555533333223
0222  21111211112211111112111112000000000000000000000
0230  208482314644672115555551222888778555557232323236
0233  21121121222121222221111111122222111111111111111
0240  2084823231443830445544136665685445656523233332
0244  21111113001111111113011112111112111112111112
0250  208601244144281135554414441115552224543333336
0255  21012123012120011111000000010000000000011110
0260  113423378274291121544410750360780100222332336
0266  21011111000020000010200000000001000002000000
0270  11360227865424433544451635757835576775232336
0277  21011112011110011212000000001111001011001111
0280  113723341153264124553312032124470002133623366
0288  21011012000001101111201111201112201111 2000000
0290  202523387133335512355441011333516142344 2233343
0299  21111310211101111221122300000210000122000310
0300  20248230315336223254241232331665000443663 6666
0301  21011012000000010011001011000001011002011011
0310  200228338995224154555551797000656444777 2222336
0311  21000001011001111112111112000003000202011012
0320  20600235525424444444545166845777756756 73626336
0322  21012023023123001012003123012112022123001011
0330  206393382154645142544413123227641115462606666
0333  21102012101011001111012010001012101111101011
0340  20526335924315511555141444666666633355556666666
0344  21022113122012121103122113111003111003121001
0350  205262323154354124544411111000647101502363636 6
0355  21001003110011000002001000000002000002000001
0360  205993364153155124544311310006560006663336666
0366  21332122000000000001022022000000002100000000
0370  2052423372431731145554122100165200010123332 33
0377  21001110001110000000002010000000000000000000
0380  11336235525425514355421033033088011044660 0030
0388  21000001000010000000000000000010000001000000
0390  319003386353251542452110000003130000003616056
0399  21001012001011111111001001111011000000000000
0400  202003389353273134555410412017650104432624446
0401  21111100010000000000010000001001101000000000
0410  31630235417224432444341444435879222435333 3333
0411  21111111001211112221000100000000011100011200
0420  31636940935236322455441555777555555333133 3446
0422  21000100201100011110010000001001101100000 00
```

                    RAW DATA: CATEGORY III

```
0010  115002329244228033444442000000000000000003636346
0011  31111111111111111111111111111111010111011111110
0020  12200440945213532543552000000000000000005303040
0022  31002021002222000000002132000000000002000010
```

                              150

```
0030 20128934993336312511152000000000000000006666666
0033 31002001012102012102002110000000002011002011
0040 21230443915328202245222000000000000003623436
0044 31001010000000010000000000010000010000000000
0050 11584036904300554444431563322646333322323346
0055 31011011011011000000001000000000000011001011
0060 20400230103325322445441356233566476266261346
0066 31222112222121111111121012121011011011111111
0070 1229923241531343225452165553466622267750335456
0077 31002011110011120120021210020211120120012012001012
0080 3164833351513911145555100132166611144233333333
0088 31122111222111111101122100100012111011111000
0090 1158333792542325124542144400032311132413244446
0099 31011010112110112111011110111100011211101111110
0100 21031233625356414345444162566454531364626311126
0101 31012112011011011112211101100000100000001101 11
0110 1144844392523551224444210020004440000001333446
0111 31000001011001111011001000000000000000000000
0120 2010074060134138235454155522244422288834 31111
0122 31010011110211110111000000000000000000220000
0130 1140023192544731244555110111144400034433433333
0133 31122112122120001011001010011012021122020010
0140 21224230615324424243554410211125441114443636336
0144 31011013001101011111001001001002000003000001
0150 210369379233273133554313332125541023263416436
0155 31111111102111110102001000010011121010000000
0160 21299228925306315555555111520385632252566666666
0166 31011023001011000013002013000002000003011010
0170 1148433681342371224444153323444434341334 60066
0177 31000000011110110100010010111110111111000000
0180 21000335425443336535553111113337774446661326666
0188 31010102010100020101000011010101010101020000
0190 11400334415428122245441264211888000000034333 46
0199 31011013001011001011000002000011000012000001
0200 1142434122533821324543123222224444445555332 3330
0201 31000000011101001111001000000000100101 1000000
0210 1140033792532235455545142464677756555533344 36
0211 31111012011021011113112121011012011012011011
0220 316784406252263222551411412226660224453333333
0222 31001100002000000000011000000000000000000000
0230 319993419755583134445513623453240100001626126
0233 31002001001101001111002010000000001000000000
0240 31699949993339012555431465222555111555536 23336
0244 31000001000001000000000002000000000000000000
0250 32136724313323354314341353777545032524 5231356
0255 31021112031012001003000100023000020020 30031
0260 12296335935316043545451555444767335456633336
0266 31002011010011011001011011010011012011010011
0270 12299335615335332355441444666888777999 0636126
0277 31011001001000011001012100012002000000011100
0280 11599339925534514455241798555324111336 3600646
0288 31001200001210011210000100021230021220010310
0290 11500338715425332454541000444757333646666 33306
```

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```
0299 310010110010100110110000000010110000110010000
0300 11584337917412081445541444222666121343343356
0301 310010120000000110120010010110110000000001010
0310 20423236315323614355541253202867121334362226
0311 310100010210110110120332330110110020300100010
0320 12284236953237212244431666666666666666413416
0322 310110130000030111120111100111110111111000000
```

RAW DATA: CATEGORY IV

```
0010 20184960980348215455351222333777444422253322236
0011 41000001000001000000000100000000000000000000001
0020 20608337225422532255421333322555000444000000000
0022 41011001000000000000000000000010001111000000
0030 20699234434333541335545166677788854699993413346
0033 41011112012111011111001001000001000002000011
0040 20100935933345412344441303444666555344322141416
0044 41000001000001011111011011011111011111011011
0050 20499953433537122415531000222757000233051340400
0055 41000001000001000000000000000000000000000000
0060 321609369232582122554410209785240114464444345
0066 4112111212111311101211212200000010110120000000
0070 20499941955335504444441222444555333666666666
0077 41111000111000011000000000111000111000111000
0080 32199940914223614255441355201646441543131031036
0088 410031120010001110010032120011011120200000100
0090 31660337714328202344441016114443127456311433336
0090 41002112002011000000011010000101000001000100
0100 2049922844533641324453112121254500044411116116
0101 41000001001101000000000001000000000101000000
0110 2065844199532442445444515357777774444443633266
0111 410110221111101100030221131020021111113011021
0120 2060090097343622444444513337776664444446346244456
0122 41001001001101000000011010000000000001000000
0130 2069993260343551154453144444488844466666612311
0133 41000000000000000000000000000000000001000000
0140 2063492823532911424444102022253300000026266366
0144 41000001000000011101000001000000000000000011
0150 2060033821431281244442312228888882224446420066
0155 41001001001001000000000000000001000000000000
0160 2069995999342542434444112166688866654566366666
0166 41011001001001001001000000000000000000000000
0170 2060044565532731444454144421055533445326322233
0177 41000001101011100011101000000000000000000000
0180 2069994849343461424422122277766544466700000000
0188 41000000000000001000000000000000001000000000
0190 201003429252490044453413334448884445553633336
0199 41011011111111011111000110012012111112100001
0200 2019995394132000345444122377786833322216644146
0201 41000011001011011111011011011011000000000000
0210 2019923040343622234544124555766500253814366666
0211 41011011011121001010002100001001012012001011
```

```
0220  20199234925421542344431644121665545655132113
0222  41011111000000000000000000000000000000001111110
0230  20199439225225414244421222222242212123266242556
0233  41011111000010001111000110000010000000100000
0240  2019999589902453222424416569997775555566134411
0244  41001011001011111111100000000011100000011000000
0250  20160337315321552243441404222662226561121246
0255  41011010001001010011010010000000010011011011
0260  20100335934321915455551333434767141245063233 6
0266  41111101111002111001111000111001111001111001
0270  201603398353254143444311111111222000211122323 2
0277  41011000010000001000000100010000010000000000
0280  20178232205215235555555135399966645496861234 46
0288  41022013000113020013003031002023022013000013
0290  2017223692421244545455133353555534363666622 26
0299  41011012011111201101200111100100101111011011
0300  2017823661532335324542113222275845342463213 36
0301  41011111012012011110001010011012011122011012
0310  2017844481522821432445142452575744462666364 46
0311  41121112111011011011001110001011012122111012
0320  201999396254791045552220000000000000003433 46
0322  41133233303333300000000111110111110000111111 11
```

PART 2. COMPUTER PROGRAMS

TEST I

```
0010  S,R(SL) :,8,16;,,16
0020$:IDENT:WP1191, AFIT/SIG  ESCHMANN AND LEE
0030S:SELECT:SPSS/SPSS
0040RUN NAME;KENDALL TAU STATISTICS
0050VARIABLE LIST;CON,FSD,PRO,DEP
0060INPUT FORMAT;FREEFIELD
0070INPUT MEDIUM;CARD
0080N OF CASES;7
0090NONPAR CORR;CON,FSD,PRO,DEP
01000PTIONS;1,5
0110STATISTICS;ALL
0120READ INPUT DATA
0200 .789 .845 .719 .656
0210 .672 .635 .703 .568
0215 .767 .694 .693 .448
0220 .800 .694 .578 .427
0225 .467 .508 .464 .339
0230 .711 .655 .547 .490
0235 .356 .377 .391 .333
9990GINISH
9995$:ENDJOB
```

TEST II

```
0010  S,R(SL) :,8,16;,,16
0020$:IDENTI:WP1191, AFIT/SIG  ESCHMANN AND LEE
0030$:SELECT:SPSS/SPSS
0040RUN NAME;KENDALL TAU STATISTICS
0050VARIABLE LIST;G1 TO G6
0060INPUT FORMAT;FREEFIELD
0070INPUT MEDIUM;CARD
0080N OF CASES;7
0090NONPAR CORR;G1 TO G6
01000PTIONS;1,5
0110STATISTICS;ALL
0120READ INPUT DATA
0200 .287 .706 1.096 .507 .721 1.235
0210 .309 .632  .912 .529 .684  .794
0215 .353 .699  .779 .478 .566 1.037
0220 .228 .537 1.140 .544 .632  .684
0225 .162 .360  .610 .331 .412  .816
0230 .257 .515  .801 .412 .551 1.081
0235 .199 .419  .419 .287 .412  .456
9990FINISH
9995$:ENDJOB
```

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RESEARCH HYPOTHESIS I

```
0010  S,R(SL) :,8,16;,,16
0020$:IDENT :WP1191, AFIT/SIG  ESCHMANN AND LEE
0030$:SELECT:SPSS/SPSS
0040RUN NAME;KENDALL TAU STATISTICS
0050VARIABLE LIST;CON,FSD,PRO,DEP,WTCON,WTFSD,WTPRO,WTDEP
0060INPUT FORMAT;FREEFIELD
0070INPUT MEDIUM;CARD
0080N OF CASES;7
0090NONPAR CORR;CON,FSD,PRO,DEP,WTCON,WTFSD,WTPRO,WTDEP
01000PTIONS;1,5
0110STATISTICS;ALL
0120READ INPUT DATA
0200 2 1 1 1 1 1 4 4
0210 5 5 2 2 2 3 5 7
0215 3 2.5 3 4 6 4 2 6
0220 1 2.5 4 5 4 5 3 3
0225 6 6 6 6 5 7 5 5
0230 4 4 5 3 3 2 1 1
0235 7 7 7 7 7 6 5 2
9990FINISH
9995$:END JOB
```

RESEARCH HYPOTHESIS II

```
0010  S,R(SL) :,8,16;,,16
0020$:IDENT:WP1191, AFIT/SIG  ESCHMANN AND LEE
0030$:SELECT:SPSS/SPSS
0040RUN NAME;KENDALL TAU STATISTICS
0050VARIABLE LIST;TOTRAW,TOTR,WTTOTR
0060INPUT FORMAT;FREEFIELD
0070INPUT MEDIUM;DARD
0080N OF CASES;5
0090NONPAR CORR;TOTRAW,TOTR,WTTOTR
01000PTIONS;1,5
0110STATISTICS;ALL
0120READ INPUT DATA
0200 37.02   4 4
0210 46.275  3 3
0215 67.308  1 1
0220 32.871  5 5
0225 49.852  2 2
9990FINISH
9995$:ENDJOB
```

MEANS FOR CONFLICT SOURCE INTENSITIES

AND MODES OF RESOLUTION

```
0010  S,R(SL) :,8,16;;,16
0020$:IDENT:WP1191,AFIT/SIG  KARL ESCHMANN AND TERRY LEE
0030$:SELECT:SPSS/SPSS
0040RUN NAME;CONFLICT IN MANAGEMENT
0050FILE NAME;ESCHMANN
0060VARIABLE LIST;Q1 TO Q85
0070VAR LABELS;Q1, PROGRAM NAME/Q2,PROGRAM AGE/Q3,RANK/
0080;Q4,AGE/Q5,EXPERIENCE/Q6,NUMBER OF PROGRAMS/
0090;Q7,EDUCATION/Q8,ORGANIZATION LEVEL/
0100;Q9,PROJECT VS FUNCTIONAL/Q10,SELF AND SUBORDINATES/
0110;Q11,COLLOCATED FUNCT PERSONNEL
0120;Q12,OTHER FUNCT PERSONNEL/
0130;Q13,DIVERSITY OF EXPERTISE/Q14,LOW PM POWER/
0140;Q15,LESS SPECIFIC OBJECTIVES/Q16,GREATER ROLE AMBIGUITY/
0150;Q17,GREATER GOAL AGREEMENT/
0160;Q18,LESS PM FORMAL AUTH
0300SUBFILE LIST;FULL (42) PROD (32) DEPL (32) VALI (30)
0400INPUT FORMAT;FIXED (1X,F3.0,F2.0,F1.0,F2.0,37F1.0/1X,44F1.0)
0420INPUT MEDIUM;CARD
0440MISSING VALUES;ALL(0)
0450RECODE;Q3 (1 THRU 5=1)(0=2)(ELSE=3)
0460VALUE LABELS;Q3 (1)MILITARY  (2)NO ANS  (3)CIVILIAN
0480VALUE LABELS;Q13 TO Q18  (1)STRONGLY DISAGREE (2)DISAGREE
0482;(3)UNDECIDED  (4)AGREE (5)STRONGLY AGREE (0)NO ANS
0485RUN SUBFILES;ALL (OR EACH)
0490*SELECT IF;(Q3 EQ 1)
0500FREQUENCIES;GENERAL=Q13 TO Q18
0510OPTIONS;1,8
0520READ INPUT DATA
0532$:SELECTA:77B53/FULLSD,R
0534$:SELECTA:77B53/PRODUCT,R
0536$:SELECTA:77B53/DEPLOY,R
0537$:SELECTA:77B53/VALIDATA,R
0538RUN SUBFILES;ALL (OR EACH)
0540*SELECT IF;(Q3 EQ 3)
0550FREQUENCIES;GENERAL=Q13 TO Q18
0560OPTIONS;1,8
0565RUN SUBFILES;ALL (OR EACH)
0570FREQUENCIES;GENERAL=Q13 TO Q18
0575OPTIONS;1,8
0695RUN SUBFILES;ALL (OR EACH)
0700*COMPUTE;S1=(Q44+Q45+Q46+Q47+Q48+Q49)/6
0710*COMPUTE;S2=(Q50+Q51+Q52+Q53+Q54+Q55)/6
0720*COMPUTE;S3=(Q56+Q57+Q58+Q59+Q60+Q61)/6
0730*COMPUTE;S4=(Q62+Q63+Q64+Q65+Q66+Q67)/6
0740*COMPUTE;S5=(Q68+Q69+Q70+Q71+Q72+Q73)/6
0750*COMPUTE;S6=(Q74+Q75+Q76+Q77+Q78+Q79)/6
0760*COMPUTE;S7=(Q80+Q81+Q82+Q83+Q84+Q85)/6
0770*SELECT IF;(Q43 EQ 1)
0280CONDESCRIPTIVE;S1,S2,S3,S4,S5,S6,S7
0790OPTIONS;1
0800STATISTICS;ALL(OR EACH)
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```
0805RUN SUBFILES;ALL(OR EACH)
0810*SELECT IF;(Q43 EQ 1)
0820CONDESCRIPTIVE;Q44 TO Q85
08300PTIONS;1
0840STATISTICS;ALL (OR EACH)
0845RUN SUBFILES;ALL (OR EACH)
0850*SELECT IF;(Q19 EQ 1)
0860CONDESCRIPTIVE;Q20 TO Q34
08700PTIONS;1
0875RUN SUBFILES;ALL (OR EACH)
0900*COMPUTE;M1=(Q20+Q21+Q22)/3
0910*COMPUTE;M2=(Q23+Q24+Q25)/3
0920*COMPUTE;M3=(Q26+Q27+Q28)/3
0930*COMPUTE;M4=(Q29+Q30+Q31)/3
0940*COMPUTE;M5=(Q32+Q33+Q34)/3
0950*SELECT IF;(Q19 EQ 1)
0960CONDESCRIPTIVE;M1,M2,M3,M4,M5
09700PTIONS;1
9990FINISH
9995$:ENDJOB
```

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BIOGRAPHICAL SKETCHES OF THE AUTHORS

BIOGRAPHICAL SKETCHES OF THE AUTHORS

Captain Karl J. Eschmann graduated in 1971 from Texas A & M University, College Station, Texas with a B.S. degree in Aerospace Engineering. Upon completion of the Aircraft Maintenance Officers Course in 1972, he was assigned to Korat RTAFB, Thailand as a F-4E Flightline Maintenance Officer. His prior assignment was at MacDill AFB, Florida as a Job Control Officer. His next assignment will be as the OIC of the Numerical Control section in the Air Logistics Center at Tinker AFB, Oklahoma.

Captain Terry S. H. Lee graduated from Harvey Mudd College, California in 1968 with a B.S. degree in General Engineering. He completed Officer Training School in June 1969 and the Aircraft Maintenance Officer Course in February 1970. His previous assignments were as a B-52/KC-135 Maintenance Officer at March AFB, California and Utapao RTAFB, Thailand, and a F-111 Workloader at the Sacramento Air Logistics Center in McClellan AFB, California. His next assignment will be to Strategic Air Command Headquarters at Offutt AFB, Nebraska as a Maintenance Staff Officer.

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